Technical Appendix for Submission titled:

“Cryptosporidium and ‘code brown’ – a participatory modelling approach to clearing the pool water”

Parameter values used in the model

Variable name	Unit	Distribution	Mean	Median	5th percentile	95th percentile	Reference
Population Sector							
Regional population	Persons	Empirical distribution	--	--	--	--	[1]
Incubation period	Days	BETA(3.25, 2.75, 1, 12)[a]	7.00	7.04	3.98	9.93	[2],[3],[4], [5]
Probably of being symptomatic given infection	Persons/ Exposed	BETA(2.16, 3.84, 0.5, 0.88)[a]	0.64	0.63	0.54	0.76	[6],[3, 7],
Duration of symptoms	Days	BETA(2.04, 3.96, 1, 28)[a]	11.31	10.93	3.45	20.51	[8], [2],[3],[4], [5]
Reinfection delay	Days	BETA(1.5, 4.5, 2, 10)[a]	4.02	3.79	2.30	6.56	[9]
Relapse rate	Persons/ Infected	BETA(1.68, 4.32, 0.18, 0.95)[a]	0.37	0.36	0.22	0.58	[10],[11],[12],[13]
Relapse duration	Days	BETA(1.29, 4.71, 1, 15)[a]	4.02	3.60	1.29	8.35	[9]
Post-symptom infectious period	Days	BETA(2.69, 3.31, 1, 15)[a]	6.84	6.78	2.94	10.91	[2]
Secondary transmission sector							
Adult secondary transmission rate	Persons/ Infected	UNIFORM(0, 0.05)[b]	2.53E-02	2.49E-02	2.47E-03	4.79E-02	[9]
Child secondary transmission rate	Persons/ Infected	BETA(3.19, 2.81, 0, 0.31)[a]	1.63E-01	1.64E-01	6.73E-02	2.59E-01	[12], [3],[14], [15]
Susceptible Contacted People (transit time)	Days	BETA(1.67, 4.33, 1, 43)[a]	12.27	11.16	3.09	25.02	[4], [12]
Healthcare sector							
Health seeking fraction	Persons/ Symptomatic	BETA(3.25, 2.75, 0.137, 0.24)[a]	0.19	0.19	0.16	0.22	[16], [17]
Treatment seeking delay	Days	BETA(1.31, 4.69, 1, 27)[a]	6.61	5.82	1.64	14.05	Expert opinion
Fraction of people tested	Persons/ Treated	BETA(3.08, 2.92, 0.062, 0.283)[a]	0.18	0.18	0.11	0.24	[17],[18], [19], [16]
Fraction of tests submitted	Persons/ Tested	BETA(4, 2, 0.91, 0.95)[a]	0.93	0.93	0.92	0.95	[19]
Faecal testing delay	Days	UNIFORM(1, 5)[b]	3.03	3.02	1.22	4.84	Unpublished government data
Microscopy sensitivity	Dimensionless	BETA(3.26, 2.74, 0.33, 1)[a]	0.70	0.70	0.49	0.89	[20], [21], [22], [23]
PCR sensitivity	Dimensionless	BETA(3.76, 2.24, 0.8,0.939)[a]	0.89	0.89	0.84	0.93	[20], [21], [24]
Awareness delay	Days						

Variable name	Unit	Distribution	Mean	Median	5th percentile	95th percentile	Reference
[Under 5 Years Old]		BETA(1.66, 4.33, 1, 7) [a]	2.66	2.51	1.28	4.51	Unpublished government data
[Over 5 Years Old]		BETA(1.89, 4.11, 1, 10) [a]	1.32	1.29	1.07	1.65	
Public Aquatic Facility Sector							
Daily Swimming frequency	Swims/Day	BETA(1.51, 4.49, 0.008,0.8) [a]	0.21	0.18	0.04	0.45	[25]
Percent of patrons who shower LP	Persons/ Person	Point-estimate	0.15	--	--	--	Expert opinion
Percent of patrons who shower LP	Persons/ Person	Point-estimate	0.15	--	--	--	Expert opinion
Probability of AFR given infection	AFR/Swim						
[Under 5 years old]		BETA(1.44, 4.56, 0.005, 0.05) [a]	1.13E-02	9.87E-03	1.97E-03	2.53E-02	Expert opinion
[Over 5 years old]		BETA(2.78, 3.22, 0.001, 0.01) [a]	5.22E-03	5.18E-03	2.46E-03	8.10E-03	
Weight of faeces shed	Grams						
[Under 5 years old]		BETA(1.1, 4.9, 0.01, 5) [a]	0.88	0.70	0.08	2.34	[26]
[Over 5 years old]		UNIFORM(0.001, 0.1)	0.05	0.05	0.01	0.10	
Weight of faeces in AFR	Grams						[27]
[Under 5 years old]		TRIANGULAR(30, 50, 70) [c]	49.93	49.98	36.60	63.73	
[Over 5 years old]		TRIANGULAR(100, 150, 200) [c]	1.49 E+02	1.49 E+02	1.16 E+02	1.84 E+02	
Oocytes in 1 gram of stool	Oocytes	UNIFORM(50, 10^6) [b]	4.93E+05	4.85E+05	5.32E+04	9.42E+05	[28]
Oocyte inactivation	Days	UNIFORM(2, 7) [b]	4.52	4.55	2.24	6.77	[29]
Pool waster ingested per swim	Litres						
[Under 5 Years Old, Large pool]		BETA(1.96, 4.04, 0, 0.154) [a]	5.14E-02	4.90E-02	1.35E-02	9.85E-02	[30]
[Under 5 Years Old, Small pool]		BETA(1.96, 4.04, 0, 0.154) [a]	5.02E-02	4.74E-02	1.36E-02	9.78E-02	
[Over 5 Years Old, Large pool]		BETA(2.21, 3.79, 0, 0.053) [a]	1.96E-02	1.87E-02	6.49E-03	3.52E-02	
[Over 5 Years Old, Small pool]		UNIFORM(0, 0.01) [b]	5.06E-03	5.12E-03	5.22E-04	9.51E-03	
Percent of oocytes viable		BETA(2.94, 3.06, 61.1, 100) [a]	60.47	60.31	35.75	85.68	[31]
Dose response parameter		BETA(2.55,3.45, 0.005,0.066) [a]	3.09E-02	3.07E-02	1.28E-02	5.07E-02	[32], [33], [34]
Large Pool Volume	Litres						
[LP1, LP2, LP3,]		Point-estimate	3.75E+05	--	--	--	Expert opinion
[LP4, LP5, LP6,]		Point-estimate	4.87E+05	--	--	--	
[LP7, LP8, LP9, LP10]		Point-estimate	2.50E+06	--	--	--	
Small Pool Volume	Litres						
[SP1, SP2]		Point-estimate	2.05E+05	--	--	--	Expert opinion

Variable name	Unit	Distribution	Mean	Median	5th percentile	95th percentile	Reference
[SP3, SP4]		Point-estimate	1.17E+05	--	--	--	
[SP5]		Point-estimate	6.96E+04	--	--	--	
Seasonal LP Users [Summer]	Persons/						Expert opinion
[LP1, LP2, LP3, LP4,LP5,LP6]	Person/Day	Point-estimate	0.066	--	--	--	
[LP7,LP8,LP9,LP10]		Point-estimate	0.15	--	--	--	
Seasonal LP Users [Winter]	Persons/						Expert opinion
[LP2, LP3, LP4, LP5]	Person/Day	Point-estimate	0.1	--	--	--	
[LP7, LP8,LP9]		Point-estimate	0.2	--	--	--	
[LP1, LP6, LP10]		Point-estimate	0	--	--	--	
Seasonal SP Users [Summer]	Persons/						Expert opinion
[SP1, SP2]	Person/Day	Point-estimate	0.3	--	--	--	
[SP3]		Point-estimate	0.2	--	--	--	
[SP4, SP5]		Point-estimate	0.1	--	--	--	
Seasonal SP Users [Winter]	Persons/						Expert opinion
[SP1]	Person/Day	Point-estimate	0	--	--	--	
[SP2]		Point-estimate	0.5	--	--	--	
[SP3]		Point-estimate	0.3	--	--	--	
[SP4, SP5]		Point-estimate	0.1	--	--	--	
Log-3 disinfection LP	Days	BETA(2.47,3.53, 1.16, 2.63)	1.77	1.76	1.35	2.24	[35]
Log-3 disinfection SP	Days	BETA(3.071,2.929, 0.58, 1.7)	1.15	1.16	0.80	1..50	[35]
Imported Cases Sector							
Daily Departures	Days	Empirical distribution	--	--	--	--	[36]
SEQ fraction							[36]
[Under 5 Years Old, Metro North]		Point-estimate	0.19	--	--	--	
[Under 5 Years Old, Metro South]		Point-estimate	0.24	--	--	--	
[Under 5 Years Old, Gold Coast]		Point-estimate	0.11	--	--	--	
[Over 5 Years Old, Metro North]		Point-estimate	0.20	--	--	--	
[Over 5 Years Old, Metro South]		Point-estimate	0.22	--	--	--	
[Over 5 Years Old, Gold Coast]		Point-estimate	0.12	--	--	--	
Proportion of low risk travellers	persons	Empirical distribution	--	--	--	--	[36]
Low-risk infection rate	Infections/ Traveller	UNIFORM(0,0.009) [b]	0.004	0.004	0.000	0.009	[20]
High-risk infection rate	Infections/ Traveller	UNIFORM(0, 0.014) [b]	0.007	0.007	0.001	0.013	[20]

Variable name	Unit	Distribution	Mean	Median	5th percentile	95th percentile	Reference
Rate of Asymptomatic Travellers	Persons/ Exposed	BETA(2.16, 3.84, 0.5, 0.88) [a]	0.64	0.63	0.54	0.76	[20]
Length of travel	Days	UNIFORM(2, 30) [b]	15.85	15.67	3.40	28.68	[36]
Public Health Sector							
Notification delay	Days	LOGNORMAL(6.29, 4.65) [d]	6.36	5.10	1.67	15.06	Unpublished government data
Routine Messaging Effectiveness	Persons/ Person/Day	Point-estimate	0.05				Expert opinion
Routine Messaging Effectiveness Decay	Days	Point-estimate	15				Expert opinion
Healthcare Messaging Effectiveness	Persons/ Person/Day	Point-estimate	0.05				Expert opinion
Healthcare Messaging Effectiveness Decay	Days	Point-estimate	15				Expert opinion

[a] Beta (α, β, min, max) [c] TRIANGULAR(min, mode, max)
[b] UNIFORM(min, max) [d] LOGNORMAL(mean, standard deviation)

1. Queensland Government Statistician's Office, *Population growth highlights and trends, Queensland regions, 2015 edition*, Q. Treasury, Editor. 2015: Queensland, Australia.
2. Jokipii , L. and A.M.M. Jokipii *Timing of Symptoms and Oocyst Excretion in Human Cryptosporidiosis.* New England Journal of Medicine, 1986. **315**(26): p. 1643-1647.
3. Heijbel, H., et al., *Outbreak of diarrhea in a day care center with spread to household members: the role of Cryptosporidium.* Pediatr Infect Dis J, 1987. **6**(6): p. 532-5.
4. Johansen, O.H., et al., *Symptomatic and asymptomatic secondary transmission of Cryptosporidium parvum following two related outbreaks in schoolchildren.* Epidemiol Infect, 2015. **143**(8): p. 1702-9.
5. Millard, P.S., et al., *An outbreak of cryptosporidiosis from fresh-pressed apple cider.* Jama, 1994. **272**(20): p. 1592-1596.
6. Okhmatovskaia, A., et al., *A simulation model of waterborne gastro-intestinal disease outbreaks: description and initial evaluation.* AMIA Annu Symp Proc, 2010. **2010**: p. 557-61.
7. Soller, J.A., et al., *Estimated human health risks from exposure to recreational waters impacted by human and non-human sources of faecal contamination.* Water Res, 2010. **44**(16): p. 4674-91.
8. Hunter, P.R., et al., *Health Sequelae of Human Cryptosporidiosis in Immunocompetent Patients.* Clinical Infectious Diseases, 2004. **39**(4): p. 504-510.
9. MacKenzie, W.R., et al., *Massive outbreak of waterborne cryptosporidium infection in Milwaukee, Wisconsin: recurrence of illness and risk of secondary transmission.* Clin Infect Dis, 1995. **21**(1): p. 57-62.
10. Okhuysen, P.C., et al., *Susceptibility and serologic response of healthy adults to reinfection with Cryptosporidium parvum.* Infect Immun, 1998. **66**(2): p. 441-3.
11. Hunter, P.R., et al., *Sporadic cryptosporidiosis case-control study with genotyping.* Emerg Infect Dis, 2004. **10**(7): p. 1241-9.
12. Boehmer, T.K., et al., *Cryptosporidiosis from a community swimming pool: outbreak investigation and follow-up study.* Epidemiol Infect, 2009. **137**(11): p. 1651-4.
13. MacKenzie, W.R., J.J. Kazmierczak, and J.P. Davis, *An outbreak of cryptosporidiosis associated with a resort swimming pool.* Epidemiology & Infection, 1995. **115**(03): p. 545-553.
14. Goh, S., et al., *Sporadic cryptosporidiosis, North Cumbria, England, 1996-2000.* Emerg Infect Dis, 2004. **10**(6): p. 1007-15.
15. Causer, L.M., et al., *An outbreak of Cryptosporidium hominis infection at an Illinois recreational waterpark.* Epidemiol Infect, 2006. **134**(1): p. 147-56.
16. Vally, H., et al., *Higher rate of culture-confirmed Campylobacter infections in Australia than in the USA: is this due to differences in healthcare-seeking behaviour or stool culture frequency?* Epidemiol Infect, 2009. **137**(12): p. 1751-8.
17. Scallan, E., et al., *Prevalence of diarrhoea in the community in Australia, Canada, Ireland, and the United States.* Int J Epidemiol, 2005. **34**(2): p. 454-60.
18. OzFoodNet Working Group, *Foodborne disease in Australia: incidence, notifications and outbreaks. Annual report of the OzFoodNet network, 2002.* Communicable diseases intelligence quarterly report, 2003. **27**(2): p. 209.
19. Kirk, M., et al., *Foodborne illness in Australia: Annual incidence circa 2010*. 2014, Commonwealth of Australia: Canberra.
20. ten Hove, R.J., et al., *Molecular diagnostics of intestinal parasites in returning travellers.* Eur J Clin Microbiol Infect Dis, 2009. **28**(9): p. 1045-53.
21. Stark, D., et al., *Evaluation of the EasyScreen™ Enteric Parasite Detection Kit for the detection of Blastocystis spp., Cryptosporidium spp., Dientamoeba fragilis, Entamoeba complex, and Giardia intestinalis from clinical stool samples.* Diagnostic Microbiology and Infectious Disease, 2014. **78**(2): p. 149-152.
22. Van den Bossche, D., et al., *Comparison of four rapid diagnostic tests, ELISA, microscopy and PCR for the detection of Giardia lamblia, Cryptosporidium spp. and Entamoeba histolytica in feces.* J Microbiol Methods, 2015. **110**: p. 78-84.
23. Chalmers, R.M., et al., *Comparison of diagnostic sensitivity and specificity of seven Cryptosporidium assays used in the UK.* J Med Microbiol, 2011. **60**(Pt 11): p. 1598-604.
24. Haque, R., et al., *Multiplex real-time PCR assay for detection of Entamoeba histolytica, Giardia intestinalis, and Cryptosporidium spp.* Am J Trop Med Hyg, 2007. **76**(4): p. 713-7.
25. Australian Bureau of Statistics, *Participation in Sport and Physical Recreation, 2013-14*. 2014: Australia.
26. Gerba, C.P., *Assessment of Enteric Pathogen Shedding by Bathers during Recreational Activity and its Impact on Water Quality.* Quantitative Microbiology, 2000. **2**(1): p. 55-68.
27. Pintar, K.D., et al., *A risk assessment model to evaluate the role of fecal contamination in recreational water on the incidence of cryptosporidiosis at the community level in Ontario.* Risk Anal, 2010. **30**(1): p. 49-64.
28. Castor, M.L. and M.J. Beach, *Reducing illness transmission from disinfected recreational water venues: swimming, diarrhea and the emergence of a new public health concern.* Pediatr Infect Dis J, 2004. **23**(9): p. 866-70.
29. Ryan, U., S. Lawler, and S. Reid, *Limiting swimming pool outbreaks of cryptosporidiosis - the roles of regulations, staff, patrons and research.* J Water Health, 2017. **15**(1): p. 1-16.
30. Dufour, A.P., et al., *Water ingestion during swimming activities in a pool: a pilot study.* J Water Health, 2006. **4**(4): p. 425-30.
31. Schets, F.M., G.B. Engels, and E.G. Evers, *Cryptosporidium and Giardia in swimming pools in the Netherlands.* J Water Health, 2004. **2**(3): p. 191-200.
32. Messner, M.J., C.L. Chappell, and P.C. Okhuysen, *Risk assessment for Cryptosporidium: a hierarchical Bayesian analysis of human dose response data.* Water Res, 2001. **35**(16): p. 3934-40.
33. Brouwer, A.F., et al., *Dose-response relationships for environmentally mediated infectious disease transmission models.* PLoS Comput Biol, 2017. **13**(4): p. e1005481.

34. Ryu, H., et al., *Assessment of the risk of infection by Cryptosporidium and Giardia in non-potable reclaimed water.* Water Sci Technol, 2007. **55**(1-2): p. 283-90.
35. Centers for Disease Control and Prevention, *2016 Model Aquatic Health Code*. 2016.
36. Australian Bureau of Statistics. *Regional Population Growth, Australia, 2013-14*. 2015 29 March 2016 [cited 2016 Spetember 26]; Available from: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/3218.0Main%20Features302013-14?opendocument&tabname=Summary&prodno=3218.0&issue=2013-14&num=&view=#.

Model equations and values as run during the base case scenario.

{ STELLA ARCHITECT VERSION 1.7.1 }

{ TIME SPECS }
STARTTIME=1
STOPTIME=3651
DT=0.5
INTEGRATION=EULER
RUNMODE=NORMAL
PAUSEINTERVAL=0
{ The model has 255 (2285) variables (array expansion in parens).
In root model and 4 additional modules with 7 sectors.
Stocks: 16 (129) Flows: 32 (291) Converters: 207 (1865)
Constants: 43 (116) Equations: 196 (2040) Graphicals: 7 (17)
There are also 84 expanded macro variables. }

{ ARRAY DIMENSIONS }
"3-log_disinfection_sens_variable"[Pool_type]
Adult_secondary_transmission_rate[PHU]
AFR_detected_LP[Large_Pool_number]
AFR_detected_SP[Small_pool_number]
AFR_detection_rate_sens_variable[Pool_type]
Asymptomatic_infection[PHU, Age]
ASYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age]
asymptomatic_returning[PHU, Age]
Asymptopatic_recovery[PHU, Age]
Avoided_cases[Age, PHU]
Aware_diagnosed_cases[Age, PHU]
Aware_imported_cases[Age, PHU]
AWARE_INFECTIOUS_PEOPLE[Age, PHU]
Aware_suspected_cases[Age, PHU]
aware_unconsulted_cases[Age, PHU]
awareness_delay[Age]
Child_secondary_transmission_rate[PHU]
Contamination_LP[PHU, Large_Pool_number]
Contamination_SP[PHU, Small_pool_number]
Crypto_dose_in_LPs[PHU, Age, Large_Pool_number]
Crypto_dose_in_SPs[PHU, Age, Small_pool_number]
Daily_departures[Age]
daily_population_change[PHU, Age]
Daily_population_change_rate[PHU, Age]
Daily_Swimming_frequency[PHU, Age]
Decontamination_LP[PHU, Large_Pool_number]
Decontamination_SP[PHU, Small_pool_number]
departing[PHU, Age]
Dose_response_parameter[PHU]
EXPOSED_TRAVELLERS[PHU, Age]
Exposure[PHU, Age]
faecal_testing_rate[Age, PHU]
fraction_of_people_tested[Age, PHU]
fraction_of_positive_cases_made_aware[Age]
health_seeking_fraction[PHU, Age]
Healthcare_Messaging_Converter[PHU]
Healthcare_Messaging_effect[PHU, Age]
healthcare_seeking_gap[Age, PHU]
healthcare_seeking_rate[Age, PHU]
healthy_swimmers_in_each_LP[PHU, Large_Pool_number, Age]
healthy_swimmers_in_each_SP[PHU, Small_pool_number, Age]
"high-risk_exposure"[PHU, Age]
HSF_mod[Age]
HSF_senvar[Age]
LATENTLY_INFECTED_PEOPLE[PHU, Age]
length_of_travel[PHU]
"Log-3_disinfection_LP"[PHU, Large_Pool_number]

"Log-3_disinfection_SP"[PHU, Small_pool_number]
"Log-3_disinfection_SP_highest_risk_only"[Small_pool_number]
LP_volume[Large_Pool_number]
Messaging_behaviour_change_proportion[PHU, Age]
microscopy_sensitivity[PHU]
New_cases_from_LP[PHU, Large_Pool_number, Age]
New_cases_from_SPs[PHU, Small_pool_number, Age]
New_person_to_person_cases[Age, PHU]
New_secondary_cases[Age, PHU]
New_swimming_related_cases[PHU, Age]
Notification_Gap[PHU, Age]
NOTIFIED_CRYPTO_CASES[PHU, Age]
notifying[PHU, Age]
Oocyst_shed_by_LP_users[PHU, Large_Pool_number, Age]
Oocyst_shed_by_SP_users[PHU, Small_pool_number, Age]
oocyte_inactivation_LP[PHU, Large_Pool_number]
oocyte_inactivation_SP[PHU, Small_pool_number]
Oocytes_from_shedding_swimmers[PHU, Age]
oocytes_in_1_gram_of_stool[PHU]
Oocytes_in_the_large_pool[PHU, Large_Pool_number]
Oocytes_in_the_small_pool[PHU, Small_pool_number]
oocytes_per_Litre_in_LPs[PHU, Large_Pool_number]
oocytes_per_Litre_in_SPs[PHU, Small_pool_number]
Oocytes_shed_into_SP[PHU, Small_pool_number]
Oocytes_shed_intoLP[PHU, Large_Pool_number]
PCR_sensitivity[PHU]
people_not_tested_but_aware[Age, PHU]
PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age, PHU]
PEOPLE_WITH_CRYPTO_TESTED[Age, PHU]
Percent_of_patrons_who_shower_LP[Age]
Percent_of_patrons_who_shower_SP[Age]
physician_precautionary_advice_fraction[Age]
Pool_waster_ingested_per_swim[Age, Pool_type]
Portion_of_population_who_swim[Age]
positive_crypto_cases[Age, PHU]
Potential_infectors[Age, PHU]
"pre-infection_contacts"[Age, PHU]
predicted_aware_infectious_people[Age, PHU]
predicted_people_with_crypto_going_to_doctor[Age, PHU]
predicted_people_with_crypto_tested[Age, PHU]
Probability_of_AFR_given_infection_LP[Age, Large_Pool_number]
Probability_of_AFR_given_infection_SP[Age, Small_pool_number]
Probability_of_infection_per_swim_event_LP[PHU, Large_Pool_number, Age]
Probability_of_infection_per_swim_event_SP[PHU, Small_pool_number, Age]
Proportion_of_cases_avoided[Age, PHU]
proportion_of_low_risk_travellers[Age]
Reactionary_hyperchlorination_LP[PHU, Large_Pool_number]
Reactionary_hyperchlorination_SP[PHU, Small_pool_number]
RECOVERED_PEOPLE[PHU, Age]
RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]
Recovery_rate[Age, PHU]
regional_population[PHU, Age]
Relapse_recovery[PHU, Age]
RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]
Relapsing[PHU, Age]
Removal_LP[PHU, Large_Pool_number]
Removal_SP[PHU, Small_pool_number]
returning_uninfected[PHU, Age]
Routine_hyperchlorination_LP[PHU, Large_Pool_number]
Routine_hyperchlorination_SP[PHU, Small_pool_number]
Routine_Messaging_Converter[PHU]
Seasonal_converter[Age]
Seasonal_LP_users[Large_Pool_number, Season]
Seasonal_SP_users[Small_pool_number, Season]
Secondary_transmission[Age, PHU]
SEQ_fraction[PHU, Age]

Sick_swimmers_in_each_LP[PHU, Large_Pool_number, Age]
Sick_swimmers_in_each_SP[PHU, Small_pool_number, Age]
SP_volume[Small_pool_number]
SUSCEPTIBLE_CONTACTED_PEOPLE[Age, PHU]
SUSCEPTIBLE_PEOPLE[PHU, Age]
Symptomatic_infection[PHU, Age]
SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age]
symptomatic_recovery[PHU, Age]
symptomatic_returning[PHU, Age]
symptoms_waning[PHU, Age]
testing_gap[Age, PHU]
testing_mod[Age]
testing_senvar[Age]
Total_Infectious_People[PHU, Age]
total_infectious_people_per_PHU[PHU]
Total_new_infections[PHU, Age]
total_symptomatic_people[PHU, Age]
TRAVELLERS[PHU, Age]
Users_in_each_LP[Large_Pool_number]
Users_in_each_SP[Small_pool_number]
Waning_immunity[PHU, Age]
AFR_LP.AFR_LP[PHU, Large_Pool_number, Age]
AFR_LP.AFR_per_day_in_large_pool[PHU, Large_Pool_number, Age]
AFR_LP.AFR_sensitivity_converter[Age]
AFR_LP.Converter_seed[Large_Pool_number]
AFR_LP.Large_ARF_released[PHU, Large_Pool_number, Age]
AFR_LP.Oocyte_concetration_in_an_AFR[Age]
AFR_LP.oocytes_released_into_LP[PHU, Large_Pool_number]
AFR_LP.weight_of_AFR[Age]
AFR_SP.AFR_in_Small_Pool[PHU, Small_pool_number, Age]
AFR_SP.AFR_per_day_in_small_pool[PHU, Small_pool_number, Age]
AFR_SP.AFR_sensitivity_converter_SP[Age]
AFR_SP.Converter_SP_seed[Small_pool_number]
AFR_SP.Oocyte_concetration_in_an_AFR[Age]
AFR_SP.oocytes_released_into_SP[PHU, Small_pool_number]
AFR_SP.Small_ARF_released[PHU, Small_pool_number, Age]
AFR_SP.weight_of_AFR[Age]
Healthy_Swimmers.Daily_susceptible_Swimmers[PHU, Age]
Healthy_Swimmers.healthy_adults_in_LP[PHU]
Healthy_Swimmers.Healthy_adults_in_SP[PHU]
Healthy_Swimmers.healthy_children_in_LP[PHU]
Healthy_Swimmers.Healthy_children_in_SP[PHU]
Healthy_Swimmers.Healthy_People_in_LP[PHU, Age]
Healthy_Swimmers.Healthy_People_in_SP[PHU, Age]
Healthy_Swimmers.susceptible_adult_swimmers[PHU]
Healthy_Swimmers.susceptible_child_swimmers[PHU]
Healthy_Swimmers.Susceptible_swimmers[PHU, Age]
Sick_swimmers.Adults_in_LP[PHU]
Sick_swimmers.Adults_in_SP[PHU]
Sick_swimmers.children_in_LP[PHU]
Sick_swimmers.children_in_SP[PHU]
Sick_swimmers.daily_infectious_swimmers[PHU, Age]
Sick_swimmers.infectious_adult_swimmers[PHU]
Sick_swimmers.infectious_child_swimmers[PHU]
Sick_swimmers.Infectious_swimmers[PHU, Age]
Sick_swimmers.Messaging_Converter[Pool_type]
Sick_swimmers.PAF_Messaging[Pool_type]
Sick_swimmers.PAF_messaging_cycle_period[Pool_type]
Sick_swimmers.PAF_messaging_switch[Pool_type]
Sick_swimmers."Percent_of_infectious_swimmers_who_self-exclude"[PHU, Age]
Sick_swimmers.Pool_CycleStartTime[Pool_type]
Sick_swimmers.Pool_messaging_time_cycle[Pool_type]
Sick_swimmers.Sick_People_in_LP[PHU, Age]
Sick_swimmers.Sick_People_in_SP[PHU, Age]

{ SUBSCRIPT NAMES }

Age = Under_5_Years_Old,Over_5_Years_Old
Large_Pool_number = LP_1,LP_2,LP_3,LP_4,LP_5,LP_6,LP_7,LP_8,LP_9,LP_10
PHU = Metro_North,Metro_South,Gold_Coast
Pool_type = Large_pool,Small_pool
Season = Summer,Winter
Small_pool_number = SP_1,SP_2,SP_3,SP_4,SP_5

{ INITIALIZATION EQUATIONS }
: S AWARE_INFECTIOUS_PEOPLE[Age, PHU] = 0
  UNITS: persons
  VALUE: 0, 0, 0
  VALUE: 0, 0, 0
: S ASYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age] = 2.88
  UNITS: persons
  VALUE: 2.88, 2.88
  VALUE: 2.88, 2.88
  VALUE: 2.88, 2.88
: S RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age] = 1.18
  UNITS: persons
  VALUE: 1.18, 1.18
  VALUE: 1.18, 1.18
  VALUE: 1.18, 1.18
: S RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age] = 1.14
  UNITS: persons
  VALUE: 1.14, 1.14
  VALUE: 1.14, 1.14
  VALUE: 1.14, 1.14
: S SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age] = 2.88
  UNITS: persons
  VALUE: 2.88, 2.88
  VALUE: 2.88, 2.88
  VALUE: 2.88, 2.88
: c Total_Infectious_People[PHU, Age] = ASYMPTOMATIC_INFECTIOUS_PEOPLE +
RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE + RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE +
SYMPTOMATIC_INFECTIOUS_PEOPLE
  UNITS: persons
  VALUE: 8.08, 8.08
  VALUE: 8.08, 8.08
  VALUE: 8.08, 8.08
: c Proportion_of_cases_avoided[Age, PHU] = (AWARE_INFECTIOUS_PEOPLE[Age,
PHU]/Total_Infectious_People[PHU,Age])
  UNITS: Dimensionless
  VALUE: 0, 0, 0
  VALUE: 0, 0, 0
: l SUSCEPTIBLE_CONTACTED_PEOPLE[Age, PHU] = 1
  TRANSIT TIME = BETA(1.7, 4.3, 1)*40+1
  CAPACITY = INF
  INFLOW LIMIT = INF
  UNITS: persons
  VALUE: 1, 1, 1
  VALUE: 1, 1, 1
: s Oocytes_in_the_large_pool[PHU, Large_Pool_number] = 0
  UNITS: oocytes
  VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
  VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
  VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: s Oocytes_in_the_small_pool[PHU, Small_pool_number] = 0
  UNITS: oocytes
  VALUE: 0, 0, 0, 0, 0
  VALUE: 0, 0, 0, 0, 0
  VALUE: 0, 0, 0, 0, 0
: S EXPOSED_TRAVELLERS[Metro_North, Under_5_Years_Old] = 0.2
  UNITS: persons
: S EXPOSED_TRAVELLERS[Metro_North, Over_5_Years_Old] = 3.1
  UNITS: persons
: S EXPOSED_TRAVELLERS[Metro_South, Under_5_Years_Old] = 0.2

UNITS: persons
: S EXPOSED_TRAVELLERS[Metro_South, Over_5_Years_Old] = 3.6
UNITS: persons
: S EXPOSED_TRAVELLERS[Gold_Coast, Under_5_Years_Old] = 0
UNITS: persons
: S EXPOSED_TRAVELLERS[Gold_Coast, Over_5_Years_Old] = 1.9
UNITS: persons
UNITS: persons
VALUE: 0.2, 3.1
VALUE: 0.2, 3.6
VALUE: 0, 1.9
: S LATENTLY_INFECTED_PEOPLE[PHU, Age] = 1.4
UNITS: persons
VALUE: 1.4, 1.4
VALUE: 1.4, 1.4
VALUE: 1.4, 1.4
: S NOTIFIED_CRYPTO_CASES[PHU, Age] = 0.001
UNITS: Persons
VALUE: 0.001, 0.001
VALUE: 0.001, 0.001
VALUE: 0.001, 0.001
: S PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age, PHU] = 0.6
UNITS: persons
VALUE: 0.6, 0.6, 0.6
VALUE: 0.6, 0.6, 0.6
: S PEOPLE_WITH_CRYPTO_TESTED[Age, PHU] = 0.2
UNITS: persons
VALUE: 0.2, 0.2, 0.2
VALUE: 0.2, 0.2, 0.2
: S RECOVERED_PEOPLE[PHU, Age] = 0.5
UNITS: persons
VALUE: 0.5, 0.5
VALUE: 0.5, 0.5
VALUE: 0.5, 0.5
: S SUSCEPTIBLE_PEOPLE[Metro_North, Under_5_Years_Old] = 54908
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Metro_North, Over_5_Years_Old] = 798561
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Metro_South, Under_5_Years_Old] = 68454
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Metro_South, Over_5_Years_Old] = 908325
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Gold_Coast, Under_5_Years_Old] = 31100
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Gold_Coast, Over_5_Years_Old] = 461737
UNITS: persons
UNITS: persons
VALUE: 54908, 798561
VALUE: 68454, 908325
VALUE: 31100, 461737
: S TRAVELLERS[Metro_North, Under_5_Years_Old] = 179.6
UNITS: persons
: S TRAVELLERS[Metro_North, Over_5_Years_Old] = 5023.2
UNITS: persons
: S TRAVELLERS[Metro_South, Under_5_Years_Old] = 223.2
UNITS: persons
: S TRAVELLERS[Metro_South, Over_5_Years_Old] = 5706
UNITS: persons
: S TRAVELLERS[Gold_Coast, Under_5_Years_Old] = 105.2
UNITS: persons
: S TRAVELLERS[Gold_Coast, Over_5_Years_Old] = 3040.4
UNITS: persons
UNITS: persons
VALUE: 179.6, 5023.2
VALUE: 223.2, 5706
VALUE: 105.2, 3040.4

: c Portion_of_population_who_swim[Age] = 0.0596
UNITS: Dimensionless
VALUE: 0.0596, 0.0596
: c Sick_swimmers."Percent_of_infectious_swimmers_who_self-exclude"[PHU, Age] = .AWARE_INFECTIOUS_PEOPLE[Age, PHU]/.Total_Infectious_People[PHU,Age]
UNITS: Dimensionless
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
: c Sick_swimmers.Infectious_swimmers[PHU, Age] = (.Total_Infectious_People[PHU,Age]*.Portion_of_population_who_swim[Age])*(1-"Percent_of_infectious_swimmers_who_self-exclude"[PHU,Age])
UNITS: persons
VALUE: 0.481568, 0.481568
VALUE: 0.481568, 0.481568
VALUE: 0.481568, 0.481568
: c Daily_Swimming_frequency[PHU, Age] = BETA(1.5, 4.5, 1)*0.79+0.008
UNITS: persons/person/day
VALUE: 0.114832, 0.114832
VALUE: 0.114832, 0.114832
VALUE: 0.114832, 0.114832
: c CycleStartTime = INIT(TIME)
UNITS: Days
VALUE: 1
: c CyclePeriod = 365
UNITS: days
VALUE: 365
: c Time_cycle = COUNTER(CycleStartTime, CycleStartTime+CyclePeriod)
UNITS: day
VALUE: 1
: c Seasonal_converter[Under_5_Years_Old] = Time_cycle
UNITS: Dimensionless
: c Seasonal_converter[Over_5_Years_Old] = Time_cycle
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0.75, 0.4
: c Sick_swimmers.daily_infectious_swimmers[PHU, Age] = Infectious_swimmers[PHU,Age]*(.Daily_Swimming_frequency*.Seasonal_converter[Age])
UNITS: persons/day
VALUE: 0.0414745, 0.0221197
VALUE: 0.0414745, 0.0221197
VALUE: 0.0414745, 0.0221197
: c Sick_swimmers.infectious_child_swimmers[PHU] = daily_infectious_swimmers[PHU,Under_5_Years_Old]
UNITS: persons/day
VALUE: 0.0414745, 0.0414745, 0.0414745
: c Sick_swimmers.Pool_CycleStartTime[Pool_type] = INIT(TIME)
UNITS: Days
VALUE: 1, 1
: c Sick_swimmers.PAF_messaging_cycle_period[Large_pool] = 365
UNITS: Days
: c Sick_swimmers.PAF_messaging_cycle_period[Small_pool] = 365
UNITS: Days
UNITS: Days
VALUE: 365, 365
: c Sick_swimmers.Pool_messaging_time_cycle[Pool_type] = COUNTER(Pool_CycleStartTime, Pool_CycleStartTime+PAF_messaging_cycle_period)
UNITS: Days
VALUE: 1, 1
: c Sick_swimmers.Messaging_start_date = 140
UNITS: Day
VALUE: 140
: c Sick_swimmers.PAF_messaging_switch[Pool_type] = 0
UNITS: Dimensionless
VALUE: 0, 0
: c Sick_swimmers.PAF_Messaging_effectiveness = 0.1
UNITS: Dimensionless

VALUE: 0.1
: c Sick_swimmers.Messaging_Converter[Pool_type] = IF Pool_messaging_time_cycle = Messaging_start_date AND PAF_messaging_switch = 1 THEN PULSE(PAF_Messaging_effectiveness, Messaging_start_date) ELSE 0
UNITS: 1/day
VALUE: 0, 0
: c Sick_swimmers.PAF_Messaging_Effectiveness_Decay = 15
UNITS: Days
VALUE: 15
: c Sick_swimmers.PAF_Messaging[Pool_type] = DELAY1((Messaging_Converter[Pool_type]*PAF_Messaging_Effectiveness_Decay), PAF_Messaging_Effectiveness_Decay)
UNITS: Dimensionless
VALUE: 0%, 0%
: c Sick_swimmers.percent_of_children_using_LP = 0.25
UNITS: Dimensionless
VALUE: 0.25%
: c Sick_swimmers.children_in_LP[PHU] = (infectious_child_swimmers[PHU]*(1-PAF_Messaging[Large_pool]))*percent_of_children_using_LP
UNITS: persons/day
VALUE: 0.0103686, 0.0103686, 0.0103686
: c Sick_swimmers.Sick_People_in_LP[Metro_North, Under_5_Years_Old] = children_in_LP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Metro_North, Over_5_Years_Old] = Adults_in_LP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Metro_South, Under_5_Years_Old] = children_in_LP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Metro_South, Over_5_Years_Old] = Adults_in_LP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Gold_Coast, Under_5_Years_Old] = children_in_LP[Gold_Coast]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Gold_Coast, Over_5_Years_Old] = Adults_in_LP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
VALUE: 0.0103686, 0.0210137
VALUE: 0.0103686, 0.0210137
VALUE: 0.0103686, 0.0210137
: c Seasonal_LP_users[LP_1, Summer] = 0.066
UNITS: Dimensionless
: c Seasonal_LP_users[LP_1, Winter] = 0
UNITS: Dimensionless
: c Seasonal_LP_users[LP_2, Summer] = 0.066
UNITS: Dimensionless
: c Seasonal_LP_users[LP_2, Winter] = 0.1
UNITS: Dimensionless
: c Seasonal_LP_users[LP_3, Summer] = 0.066
UNITS: Dimensionless
: c Seasonal_LP_users[LP_3, Winter] = 0.1
UNITS: Dimensionless
: c Seasonal_LP_users[LP_4, Summer] = 0.066
UNITS: Dimensionless
: c Seasonal_LP_users[LP_4, Winter] = 0.1
UNITS: Dimensionless
: c Seasonal_LP_users[LP_5, Summer] = 0.066
UNITS: Dimensionless
: c Seasonal_LP_users[LP_5, Winter] = 0.1
UNITS: Dimensionless
: c Seasonal_LP_users[LP_6, Summer] = 0.066
UNITS: Dimensionless
: c Seasonal_LP_users[LP_6, Winter] = 0
UNITS: Dimensionless
: c Seasonal_LP_users[LP_7, Summer] = 0.15
UNITS: Dimensionless
: c Seasonal_LP_users[LP_7, Winter] = 0.2
UNITS: Dimensionless
: c Seasonal_LP_users[LP_8, Summer] = 0.15
UNITS: Dimensionless
: c Seasonal_LP_users[LP_8, Winter] = 0.2

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   UNITS: Dimensionless
: c Seasonal_LP_users[LP_9, Summer] = 0.15
   UNITS: Dimensionless
: c Seasonal_LP_users[LP_9, Winter] = 0.2
   UNITS: Dimensionless
: c Seasonal_LP_users[LP_10, Summer] = 0.15
   UNITS: Dimensionless
: c Seasonal_LP_users[LP_10, Winter] = 0
   UNITS: Dimensionless
   UNITS: Dimensionless
   VALUE: 0.066, 0
   VALUE: 0.066, 0.1
   VALUE: 0.066, 0.1
   VALUE: 0.066, 0.1
   VALUE: 0.066, 0.1
   VALUE: 0.066, 0
   VALUE: 0.15, 0.2
   VALUE: 0.15, 0.2
   VALUE: 0.15, 0.2
   VALUE: 0.15, 0
: c Users_in_each_LP[Large_Pool_number] = IF Time_cycle <45 OR Time_cycle>300 THEN
Seasonal_LP_users[Large_Pool_number,Winter] ELSE Seasonal_LP_users[Large_Pool_number,Summer]
   UNITS: Dimensionless
   VALUE: 0, 0.1, 0.1, 0.1, 0.1, 0, 0.2, 0.2, 0.2, 0
: c Sick_swimmers_in_each_LP[PHU, Large_Pool_number, Age] = Sick_swimmers.Sick_People_in_LP[PHU,
Age]*Users_in_each_LP[Large_Pool_number]
   UNITS: persons/day
   VALUE: 0, 0
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0, 0
   VALUE: 0.00207372, 0.00420275
   VALUE: 0.00207372, 0.00420275
   VALUE: 0.00207372, 0.00420275
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0, 0
   VALUE: 0.00207372, 0.00420275
   VALUE: 0.00207372, 0.00420275
   VALUE: 0.00207372, 0.00420275
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0.00103686, 0.00210137
   VALUE: 0, 0
   VALUE: 0.00207372, 0.00420275
   VALUE: 0.00207372, 0.00420275
   VALUE: 0.00207372, 0.00420275
   VALUE: 0, 0
: c Grams_of_faeces_shed_by_children = BETA(1.05, 4.95, 74)*4.99+0.01
   UNITS: gram/person
   VALUE: 0.553067
: c oocytes_in_1_gram_of_stool[PHU] = UNIFORM(50, 10^6, 71)
   UNITS: oocytes/gram
   VALUE: 882430, 882430, 882430
: c Oocytes_from_shedding_swimmers[Metro_North, Under_5_Years_Old] =
Grams_of_faeces_shed_by_children*oocytes_in_1_gram_of_stool[Metro_North]
   UNITS: oocytes/person
```

```
: c Oocytes_from_shedding_swimmers[Metro_North, Over_5_Years_Old] =
Grams_of_faeces_shed_by_adults*oocytes_in_1_gram_of_stool[Metro_North]
    UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Metro_South, Under_5_Years_Old] =
Grams_of_faeces_shed_by_children*oocytes_in_1_gram_of_stool[Metro_South]
    UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Metro_South, Over_5_Years_Old] =
Grams_of_faeces_shed_by_adults*oocytes_in_1_gram_of_stool[Metro_South]
    UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Gold_Coast, Under_5_Years_Old] =
Grams_of_faeces_shed_by_children*oocytes_in_1_gram_of_stool[Gold_Coast]
    UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Gold_Coast, Over_5_Years_Old] =
Grams_of_faeces_shed_by_adults*oocytes_in_1_gram_of_stool[Gold_Coast]
    UNITS: oocytes/person
    UNITS: oocytes/person
    VALUE: 488043, 137243
    VALUE: 488043, 137243
    VALUE: 488043, 137243
: c shower_sensitivity_variable = 15
    UNITS: Dimensionless
    VALUE: 15%
: c Percent_of_patrons_who_shower_LP[Age] = shower_sensitivity_variable
    UNITS: Dimensionless
    VALUE: 15%, 15%
: c Oocyst_shed_by_LP_users[PHU, Large_Pool_number, Age] =
Sick_swimmers_in_each_LP*Oocytes_from_shedding_swimmers[PHU,Age] -
((Oocytes_from_shedding_swimmers[PHU,Age]*0.8)*(Sick_swimmers_in_each_LP*((Percent_of_patrons_who_shower_LP[Ag
e]/100)+Sick_swimmers.PAF_Messaging[Large_pool])))
    UNITS: oocytes/day
    VALUE: 0, 0
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 0, 0
    VALUE: 890.618, 507.583
    VALUE: 890.618, 507.583
    VALUE: 890.618, 507.583
    VALUE: 0, 0
    VALUE: 0, 0
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 0, 0
    VALUE: 890.618, 507.583
    VALUE: 890.618, 507.583
    VALUE: 890.618, 507.583
    VALUE: 0, 0
    VALUE: 0, 0
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 445.309, 253.791
    VALUE: 0, 0
    VALUE: 890.618, 507.583
    VALUE: 890.618, 507.583
    VALUE: 890.618, 507.583
    VALUE: 0, 0
: c Sick_swimmers.infectious_adult_swimmers[PHU] = daily_infectious_swimmers[PHU,Over_5_Years_Old]
    UNITS: persons/day
    VALUE: 0.0221197, 0.0221197, 0.0221197
: c Sick_swimmers.percent_of_adults_using_SP = 0.05
    UNITS: Dimensionless
    VALUE: 0.05%
```

: c Sick_swimmers.Adults_in_LP[PHU] = (infectious_adult_swimmers[PHU]*(1-PAF_Messaging[Large_pool]))*(1-percent_of_adults_using_SP)
UNITS: persons/day
VALUE: 0.0210137, 0.0210137, 0.0210137
: c Grams_of_faeces_shed_by_adults = UNIFORM(0.001, 0.1, 72)+0.1
UNITS: gram/person
VALUE: 0.155529
: c Oocytes_shed_intoLP[PHU, Large_Pool_number] = SUM(Oocyst_shed_by_LP_users[PHU,Large_Pool_number, *])
UNITS: oocytes/day
VALUE: 0, 699.101, 699.101, 699.101, 699.101, 0, 1398.2, 1398.2, 1398.2, 0
VALUE: 0, 699.101, 699.101, 699.101, 699.101, 0, 1398.2, 1398.2, 1398.2, 0
VALUE: 0, 699.101, 699.101, 699.101, 699.101, 0, 1398.2, 1398.2, 1398.2, 0
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_1] = BETA(1.44, 4.56, 151)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_2] = BETA(1.44, 4.56, 152)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_3] = BETA(1.44, 4.56, 153)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_4] = BETA(1.44, 4.56, 154)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_5] = BETA(1.44, 4.56, 155)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_6] = BETA(1.44, 4.56, 156)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_7] = BETA(1.44, 4.56, 157)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_8] = BETA(1.44, 4.56, 158)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_9] = BETA(1.44, 4.56, 159)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_10] = BETA(1.44, 4.56, 160)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_1] = BETA(2.77, 3.22, 161)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_2] = BETA(2.77, 3.22, 162)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_3] = BETA(2.77, 3.22, 163)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_4] = BETA(2.77, 3.22, 164)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_5] = BETA(2.77, 3.22, 165)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_6] = BETA(2.77, 3.22, 166)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_7] = BETA(2.77, 3.22, 167)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_8] = BETA(2.77, 3.22, 168)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_9] = BETA(2.77, 3.22, 169)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_10] = BETA(2.77, 3.22, 170)*0.009+0.001
UNITS: AFR/Person
UNITS: AFR/Person
VALUE: 0.00348782, 0.0173197, 0.0151706, 0.0133755, 0.0117879, 0.00248884, 0.000834314, 0.0241644, 0.0200469, 0.0107389
VALUE: 0.00497968, 0.00464802, 0.00430589, 0.00682407, 0.00639087, 0.00600874, 0.00565191, 0.00402769, 0.00364295, 0.00320608
: c AFR_LP.AFR_sensitivity_converter[Under_5_Years_Old] = 0
UNITS: Dimensionless
: c AFR_LP.AFR_sensitivity_converter[Over_5_Years_Old] = 0
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0, 0
: c AFR_LP.AFR_per_day_in_large_pool[PHU, Large_Pool_number, Age] = .Sick_swimmers_in_each_LP[PHU,Large_Pool_number, Age]

```
*(.Probability_of_AFR_given_infection_LP[Age,Large_Pool_number]+(.Probability_of_AFR_given_infection_LP[Age,Large_P
ool_number] *(AFR_sensitivity_converter[Age]/100)))
   UNITS: AFR/day
   VALUE: 0, 0
   VALUE: 0.0000179581, 0.00000976723
   VALUE: 0.0000157298, 0.00000904828
   VALUE: 0.0000138685, 0.0000143399
   VALUE: 0.0000122224, 0.0000134296
   VALUE: 0, 0
   VALUE: 0.00000173014, 0.0000237536
   VALUE: 0.0000501103, 0.0000169273
   VALUE: 0.0000415718, 0.0000153104
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0.0000179581, 0.00000976723
   VALUE: 0.0000157298, 0.00000904828
   VALUE: 0.0000138685, 0.0000143399
   VALUE: 0.0000122224, 0.0000134296
   VALUE: 0, 0
   VALUE: 0.00000173014, 0.0000237536
   VALUE: 0.0000501103, 0.0000169273
   VALUE: 0.0000415718, 0.0000153104
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0.0000179581, 0.00000976723
   VALUE: 0.0000157298, 0.00000904828
   VALUE: 0.0000138685, 0.0000143399
   VALUE: 0.0000122224, 0.0000134296
   VALUE: 0, 0
   VALUE: 0.00000173014, 0.0000237536
   VALUE: 0.0000501103, 0.0000169273
   VALUE: 0.0000415718, 0.0000153104
   VALUE: 0, 0
: c AFR_LP.Converter_seed[LP_1] = 603
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_2] = 911
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_3] = 600
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_4] = 653
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_5] = 661
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_6] = 383
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_7] = 606
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_8] = 751
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_9] = 235
   UNITS: Dimensionless
: c AFR_LP.Converter_seed[LP_10] = 367
   UNITS: Dimensionless
   UNITS: Dimensionless
   VALUE: 603, 911, 600, 653, 661, 383, 606, 751, 235, 367
: c AFR_LP.AFR_LP[PHU, Large_Pool_number, Age] = BINOMIAL(1, AFR_per_day_in_large_pool,
Converter_seed[Large_Pool_number])
   UNITS: Dimensionless
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0, 0
   VALUE: 0, 0
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VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
: c AFR_LP.weight_of_AFR[Under_5_Years_Old] = TRIANGULAR(30, 50, 70, 81)
UNITS: Dimensionless
: c AFR_LP.weight_of_AFR[Over_5_Years_Old] = TRIANGULAR(100, 150, 200, 82)
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 43.108, 126.987
: c AFR_LP.number_oocytes_per_unit_weight = UNIFORM(50, 10^6, 83)
UNITS: oocytes/day
VALUE: 76096.1
: c AFR_LP.Oocyte_concetration_in_an_AFR[Age] = (weight_of_AFR[Age]*number_oocytes_per_unit_weight)
UNITS: oocytes/day
VALUE: 3.28035e+06, 9.66319e+06
: c AFR_LP.Large_ARF_released[PHU, Large_Pool_number, Age] = IF (AFR_LP[PHU,Large_Pool_number,Age]=1) THEN Oocyte_concetration_in_an_AFR[Age] ELSE 0
UNITS: oocytes/day
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
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VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0

VALUE: 0, 0
: c AFR_LP.oocytes_released_into_LP[PHU, Large_Pool_number] = SUM(Large_ARF_released[PHU,Large_Pool_number, *])
UNITS: oocytes/day
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: f Contamination_LP[PHU, Large_Pool_number] = IF
PREVIOUS(Reactionary_hyperchlorination_LP[PHU,Large_Pool_number], 0) = 1 OR
PREVIOUS(Routine_hyperchlorination_LP[PHU,Large_Pool_number], 0) = 1 THEN 0 ELSE
(Oocytes_shed_intoLP[PHU,Large_Pool_number]+AFR_LP.oocytes_released_into_LP[PHU,Large_Pool_number])
UNITS: oocytes/day
VALUE: 0, 699.101, 699.101, 699.101, 699.101, 0, 1398.2, 1398.2, 1398.2, 0
VALUE: 0, 699.101, 699.101, 699.101, 699.101, 0, 1398.2, 1398.2, 1398.2, 0
VALUE: 0, 699.101, 699.101, 699.101, 699.101, 0, 1398.2, 1398.2, 1398.2, 0
: c Sick_swimmers.children_in_SP[PHU] = (infectious_child_swimmers[PHU]*(1-PAF_Messaging[Small_pool]))*(1-
percent_of_children_using_LP)
UNITS: persons/day
VALUE: 0.0311058, 0.0311058, 0.0311058
: c Sick_swimmers.Sick_People_in_SP[Metro_North, Under_5_Years_Old] = children_in_SP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Metro_North, Over_5_Years_Old] = Adults_in_SP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Metro_South, Under_5_Years_Old] = children_in_SP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Metro_South, Over_5_Years_Old] = Adults_in_SP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Gold_Coast, Under_5_Years_Old] = children_in_SP[Gold_Coast]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Gold_Coast, Over_5_Years_Old] = Adults_in_SP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
VALUE: 0.0311058, 0.00110599
VALUE: 0.0311058, 0.00110599
VALUE: 0.0311058, 0.00110599
: c Seasonal_SP_users[SP_1, Summer] = 0.3
UNITS: Dimensionless
: c Seasonal_SP_users[SP_1, Winter] = 0
UNITS: Dimensionless
: c Seasonal_SP_users[SP_2, Summer] = 0.3
UNITS: Dimensionless
: c Seasonal_SP_users[SP_2, Winter] = 0.5
UNITS: Dimensionless
: c Seasonal_SP_users[SP_3, Summer] = 0.2
UNITS: Dimensionless
: c Seasonal_SP_users[SP_3, Winter] = 0.3
UNITS: Dimensionless
: c Seasonal_SP_users[SP_4, Summer] = 0.1
UNITS: Dimensionless
: c Seasonal_SP_users[SP_4, Winter] = 0.1
UNITS: Dimensionless
: c Seasonal_SP_users[SP_5, Summer] = 0.1
UNITS: Dimensionless
: c Seasonal_SP_users[SP_5, Winter] = 0.1
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0.3, 0
VALUE: 0.3, 0.5
VALUE: 0.2, 0.3
VALUE: 0.1, 0.1
VALUE: 0.1, 0.1
: c Users_in_each_SP[Small_pool_number] = IF Time_cycle <45 OR Time_cycle>300 THEN
Seasonal_SP_users[Small_pool_number,Winter] ELSE Seasonal_SP_users[Small_pool_number,Summer]
UNITS: Dimensionless
VALUE: 0, 0.5, 0.3, 0.1, 0.1
: c Sick_swimmers_in_each_SP[PHU, Small_pool_number, Age] = Sick_swimmers.Sick_People_in_SP[PHU,
Age]*Users_in_each_SP[Small_pool_number]

UNITS: persons/day
VALUE: 0, 0
VALUE: 0.0155529, 0.000552993
VALUE: 0.00933175, 0.000331796
VALUE: 0.00311058, 0.000110599
VALUE: 0.00311058, 0.000110599
VALUE: 0, 0
VALUE: 0.0155529, 0.000552993
VALUE: 0.00933175, 0.000331796
VALUE: 0.00311058, 0.000110599
VALUE: 0.00311058, 0.000110599
VALUE: 0, 0
VALUE: 0.0155529, 0.000552993
VALUE: 0.00933175, 0.000331796
VALUE: 0.00311058, 0.000110599
VALUE: 0.00311058, 0.000110599
: c Percent_of_patrons_who_shower_SP[Age] = shower_sensitivity_variable
UNITS: Dimensionless
VALUE: 15%, 15%
: c Oocyst_shed_by_SP_users[PHU, Small_pool_number, Age] =
Sick_swimmers_in_each_SP*Oocytes_from_shedding_swimmers[PHU,Age] -
((Oocytes_from_shedding_swimmers[PHU,Age]*0.8)*(Sick_swimmers_in_each_SP*((Percent_of_patrons_who_shower_SP[Age]/100)+Sick_swimmers.PAF_Messaging[Small_pool])))
UNITS: oocytes/day
VALUE: 0, 0
VALUE: 6679.64, 66.7872
VALUE: 4007.78, 40.0723
VALUE: 1335.93, 13.3574
VALUE: 1335.93, 13.3574
VALUE: 0, 0
VALUE: 6679.64, 66.7872
VALUE: 4007.78, 40.0723
VALUE: 1335.93, 13.3574
VALUE: 1335.93, 13.3574
VALUE: 0, 0
VALUE: 6679.64, 66.7872
VALUE: 4007.78, 40.0723
VALUE: 1335.93, 13.3574
VALUE: 1335.93, 13.3574
: c Sick_swimmers.Adults_in_SP[PHU] = (infectious_adult_swimmers[PHU]*(1-PAF_Messaging[Small_pool]))*(percent_of_adults_using_SP)
UNITS: persons/day
VALUE: 0.00110599, 0.00110599, 0.00110599
: c Oocytes_shed_into_SP[PHU, Small_pool_number] = SUM(Oocyst_shed_by_SP_users[PHU,Small_pool_number,*])
UNITS: oocytes/day
VALUE: 0, 6746.43, 4047.86, 1349.29, 1349.29
VALUE: 0, 6746.43, 4047.86, 1349.29, 1349.29
VALUE: 0, 6746.43, 4047.86, 1349.29, 1349.29
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_1] = BETA(1.44, 4.55, 101)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_2] = BETA(1.44, 4.55, 102)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_3] = BETA(1.44, 4.55, 103)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_4] = BETA(1.44, 4.55, 104)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_5] = BETA(1.44, 4.55, 105)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_1] = BETA(2.77, 3.22, 106)*0.09+0.001
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_2] = BETA(2.77, 3.22, 107)*0.09+0.001
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_3] = BETA(2.77, 3.22, 108)*0.09+0.001
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_4] = BETA(2.77, 3.22, 109)*0.09+0.001
UNITS: AFR/person

: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_5] = BETA(2.77, 3.22, 110)*0.09+0.001
UNITS: AFR/person
UNITS: AFR/person
VALUE: 0.0322167, 0.026342, 0.0230879, 0.0144843, 0.0131795
VALUE: 0.0355747, 0.0320662, 0.056731, 0.0527046, 0.049058
: c AFR_SP.AFR_sensitivity_converter_SP[Under_5_Years_Old] = 0
UNITS: Dimensionless
: c AFR_SP.AFR_sensitivity_converter_SP[Over_5_Years_Old] = 0
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0, 0
: c AFR_SP.AFR_per_day_in_small_pool[PHU, Small_pool_number, Age] = .Sick_swimmers_in_each_SP
*(.Probability_of_AFR_given_infection_SP[Age,Small_pool_number]
+(.Probability_of_AFR_given_infection_SP[Age,Small_pool_number]*(AFR_sensitivity_converter_SP[Age]/100)))
UNITS: AFR/day
VALUE: 0, 0
VALUE: 0.000409695, 0.0000177324
VALUE: 0.000215451, 0.0000188231
VALUE: 0.0000450546, 0.00000582905
VALUE: 0.0000409959, 0.00000542574
VALUE: 0, 0
VALUE: 0.000409695, 0.0000177324
VALUE: 0.000215451, 0.0000188231
VALUE: 0.0000450546, 0.00000582905
VALUE: 0.0000409959, 0.00000542574
VALUE: 0, 0
VALUE: 0.000409695, 0.0000177324
VALUE: 0.000215451, 0.0000188231
VALUE: 0.0000450546, 0.00000582905
VALUE: 0.0000409959, 0.00000542574
: c AFR_SP.Converter_SP_seed[SP_1] = 654
UNITS: Dimensionless
: c AFR_SP.Converter_SP_seed[SP_2] = 641
UNITS: Dimensionless
: c AFR_SP.Converter_SP_seed[SP_3] = 660
UNITS: Dimensionless
: c AFR_SP.Converter_SP_seed[SP_4] = 554
UNITS: Dimensionless
: c AFR_SP.Converter_SP_seed[SP_5] = 466
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 654, 641, 660, 554, 466
: c AFR_SP.AFR_in_Small_Pool[PHU, Small_pool_number, Age] = BINOMIAL(1, AFR_per_day_in_small_pool,
Converter_SP_seed[Small_pool_number])
UNITS: Dimensionless
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
: c AFR_SP.weight_of_AFR[Under_5_Years_Old] = TRIANGULAR(30, 50, 70, 81)
UNITS: Dimensionless
: c AFR_SP.weight_of_AFR[Over_5_Years_Old] = TRIANGULAR(100, 150, 200, 82)
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 43.108, 126.987

: c AFR_SP.number_oocytes_per_unit_weight = UNIFORM(50, 10^6, 83)
UNITS: oocytes/day
VALUE: 76096.1
: c AFR_SP.Oocyte_concetration_in_an_AFR[Age] = (weight_of_AFR[Age]*number_oocytes_per_unit_weight)
UNITS: oocytes/day
VALUE: 3.28035e+06, 9.66319e+06
: c AFR_SP.Small_ARF_released[PHU, Small_pool_number, Age] = IF
(AFR_in_Small_Pool[PHU,Small_pool_number,Age]=1) THEN Oocyte_concetration_in_an_AFR[Age] ELSE 0
UNITS: oocytes/day
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
: c AFR_SP.oocytes_released_into_SP[PHU, Small_pool_number] = SUM(Small_ARF_released[PHU, Small_pool_number, *])
UNITS: oocytes/day
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
: f Contamination_SP[PHU, Small_pool_number] = IF
PREVIOUS(Reactionary_hyperchlorination_SP[PHU,Small_pool_number], 0) = 1 OR
PREVIOUS(Routine_hyperchlorination_SP[PHU,Small_pool_number], 0) = 1 THEN 0 ELSE
Oocytes_shed_into_SP[PHU,Small_pool_number]+AFR_SP.oocytes_released_into_SP[PHU,Small_pool_number]
UNITS: oocytes/day
VALUE: 0, 6746.43, 4047.86, 1349.29, 1349.29
VALUE: 0, 6746.43, 4047.86, 1349.29, 1349.29
VALUE: 0, 6746.43, 4047.86, 1349.29, 1349.29
: c Adult_secondary_transmission_rate[PHU] = 1/(UNIFORM(0, 0.05, 38))
UNITS: Dimensionless
VALUE: 44.7252%, 44.7252%, 44.7252%
: c AFR_detection_rate_sens_variable[Large_pool] = 30
UNITS: Dimensionless
: c AFR_detection_rate_sens_variable[Small_pool] = 30
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 30%, 30%
: c AFR_detection_and_proper_management_rate_LP = AFR_detection_rate_sens_variable[Large_pool]
UNITS: Dimensionless
VALUE: 30%
: c AFR_detected_LP[LP_1] = IF (RANDOM(0,100,10) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_2] = IF (RANDOM(0,100,11) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_3] = IF (RANDOM(0,100,12) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_4] = IF (RANDOM(0,100,13) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_5] = IF (RANDOM(0,100,14) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_6] = IF (RANDOM(0,100,15) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_7] = IF (RANDOM(0,100,16) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_8] = IF (RANDOM(0,100,17) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_9] = IF (RANDOM(0,100,18) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0

UNITS: Dimensionless
: c AFR_detected_LP[LP_10] = IF (RANDOM(0,100,19) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0, 0, 0, 0, 0, 0, 1, 1, 0, 0
: c AFR_detection_and_proper_management_rate_SP = AFR_detection_rate_sens_variable[Small_pool]
UNITS: Dimensionless
VALUE: 30%
: c AFR_detected_SP[SP_1] = IF (RANDOM(0,100, 112) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_SP[SP_2] = IF (RANDOM(0,100, 112) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_SP[SP_3] = IF (RANDOM(0,100, 113) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_SP[SP_4] = IF (RANDOM(0,100, 114) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_SP[SP_5] = IF (RANDOM(0,100, 115) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0, 0, 0, 0, 1
: c Child_secondary_transmission_rate[PHU] = 1/(BETA(3.19,2.81, 1256)*0.31)
UNITS: Dimensionless
VALUE: 26.6378%, 26.6378%, 26.6378%
: c regional_population[Metro_North, Under_5_Years_Old] = TIME
UNITS: persons/day
: c regional_population[Metro_North, Over_5_Years_Old] = TIME
UNITS: persons/day
: c regional_population[Metro_South, Under_5_Years_Old] = TIME
UNITS: persons/day
: c regional_population[Metro_South, Over_5_Years_Old] = TIME
UNITS: persons/day
: c regional_population[Gold_Coast, Under_5_Years_Old] = TIME
UNITS: persons/day
: c regional_population[Gold_Coast, Over_5_Years_Old] = TIME
UNITS: persons/day
UNITS: persons/day
VALUE: 54908, 798561
VALUE: 54908, 908325
VALUE: 31100.2, 461737
: c daily_population_change[Metro_North, Under_5_Years_Old] = regional_population-(PREVIOUS(regional_population, 54908))
UNITS: persons/day
: c daily_population_change[Metro_North, Over_5_Years_Old] = regional_population-(PREVIOUS(regional_population, 798561))
UNITS: persons/day
: c daily_population_change[Metro_South, Under_5_Years_Old] = regional_population-(PREVIOUS(regional_population, 68453))
UNITS: persons/day
: c daily_population_change[Metro_South, Over_5_Years_Old] = regional_population-(PREVIOUS(regional_population, 908325))
UNITS: persons/day
: c daily_population_change[Gold_Coast, Under_5_Years_Old] = regional_population-(PREVIOUS(regional_population, 31100))
UNITS: persons/day
: c daily_population_change[Gold_Coast, Over_5_Years_Old] = regional_population-(PREVIOUS(regional_population, 461737))
UNITS: persons/day
UNITS: persons/day
VALUE: -0.0246575, 0.075
VALUE: -13545, -0.424658
VALUE: 0.161644, 0.117808
: c Dose_response_parameter[PHU] = BETA(2.55,3.45,842)*0.061+0.005
UNITS: persons/oocytes/day
VALUE: 0.0450262, 0.0450262, 0.0450262
: c testing_mod[Age] = 0
UNITS: Dimensionless

VALUE: 0%, 0%
: c testing_senvar[Age] = 0.062+(0.062*(testing_mod[Age]/100))
UNITS: Dimensionless
VALUE: 0.062, 0.062
: c fraction_of_people_tested[Age, PHU] = BETA(3.08, 2.91, 21)*0.2208+testing_senvar[Age]
UNITS: Dimensionless
VALUE: 0.101853, 0.101853, 0.101853
VALUE: 0.101853, 0.101853, 0.101853
: c fraction_of_tests_submitted = BETA(4, 2, 22)*0.04+0.91
UNITS: Dimensionless
VALUE: 0.947606
: c HSF_mod[Age] = 0
UNITS: Dimensionless
VALUE: 0%, 0%
: c HSF_senvar[Age] = 0.137+(0.137*(HSF_mod[Age]/100))
UNITS: Dimensionless
VALUE: 0.137, 0.137
: c health_seeking_fraction[PHU, Age] = BETA(3.25, 2.75, 59)*0.103+HSF_senvar[Age]
UNITS: Dimensionless
VALUE: 0.182377, 0.182377
VALUE: 0.182377, 0.182377
VALUE: 0.182377, 0.182377
: c Healthcare_Messaging_start_date = 140
UNITS: Day
VALUE: 140
: c Healthcare_messaging_switch = 0
UNITS: Dimensionless
VALUE: 0
: c Healthcare_Messaging_effectiveness = 5
UNITS: person/person/day
VALUE: 5%
: c Healthcare_Messaging_Converter[PHU] = IF Time_cycle = Healthcare_Messaging_start_date AND
Healthcare_messaging_switch = 1 THEN PULSE((Healthcare_Messaging_effectiveness/100),
Healthcare_Messaging_start_date) ELSE 0
UNITS: person/person/day
VALUE: 0.0000%, 0.0000%, 0.0000%
: c Healthcare_Messaging_Effectiveness_Decay = 15
UNITS: Days
VALUE: 15days
: c Healthcare_Messaging_effect[PHU, Age] =
DELAY1((Healthcare_Messaging_Converter[PHU]*Healthcare_Messaging_Effectiveness_Decay),
Healthcare_Messaging_Effectiveness_Decay)
UNITS: Dimensionless
VALUE: 0%, 0%
VALUE: 0%, 0%
VALUE: 0%, 0%
: c high_risk_infection_rate = UNIFORM(0, 0.014, 119)
UNITS: Dimensionless
VALUE: 0.00424848
: c length_of_travel[PHU] = UNIFORM(2, 30, 36)
UNITS: Days
VALUE: 18.4052, 18.4052, 18.4052
: c "Log-3_disinfection_SP"[PHU, Small_pool_number] = BETA(3.071,2.929, 20)*1.12+0.58
UNITS: Days
VALUE: 0.876, 0.876, 0.876, 0.876, 0.876
VALUE: 0.876, 0.876, 0.876, 0.876, 0.876
VALUE: 0.876, 0.876, 0.876, 0.876, 0.876
: c "Log-3_disinfection_SP_highest_risk_only"[SP_1] = UNIFORM(2,10, 20)
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_2] = UNIFORM(2,10, 20)
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_3] = UNIFORM(2,10, 20)
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_4] = BETA(3.071,2.929, 20)*1.12+0.58
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_5] = BETA(3.071,2.929, 20)*1.12+0.58

UNITS: Days
UNITS: Days
VALUE: 2.8561, 2.8561, 2.8561, 0.876, 0.876
: c low_risk_infection_rate = UNIFORM(0, 0.009,347)
UNITS: Dimensionless
VALUE: 0.00315674
: c Routine_Messaging_start_date = 140
UNITS: Day
VALUE: 140
: c PH_Public_messaging_switch = 1
UNITS: Dimensionless
VALUE: 1
: c Routine_Messaging_effectiveness = 5
UNITS: person/person/day
VALUE: 5%
: c Routine_Messaging_Converter[PHU] = IF (Time_cycle = Routine_Messaging_start_date AND PH_Public_messaging_switch = 1) THEN PULSE((Routine_Messaging_effectiveness/100), Routine_Messaging_start_date) ELSE 0
UNITS: person/person/day
VALUE: 0.0000%, 0.0000%, 0.0000%
: c Routine_Messaging_Effectiveness_Decay = 15
UNITS: Days
VALUE: 15 days
: c Messaging_behaviour_change_proportion[PHU, Age] = DELAY1(Routine_Messaging_Converter[PHU], Routine_Messaging_Effectiveness_Decay)
UNITS: person/person/day
VALUE: 0%, 0%
VALUE: 0%, 0%
VALUE: 0%, 0%
: c microscopy_sensitivity[PHU] = BETA(3.25, 2.74, 20)*0.67+0.33
UNITS: Dimensionless
VALUE: 0.526607, 0.526607, 0.526607
: c oocyte_inactivation_SP[PHU, Small_pool_number] = UNIFORM(2,10, 20)
UNITS: days
VALUE: 2.8561, 2.8561, 2.8561, 2.8561, 2.8561
VALUE: 2.8561, 2.8561, 2.8561, 2.8561, 2.8561
VALUE: 2.8561, 2.8561, 2.8561, 2.8561, 2.8561
: c PCR_sensitivity[PHU] = BETA(3.72, 2.23, 26)*0.139+0.8
UNITS: Dimensionless
VALUE: 0.883756, 0.883756, 0.883756
: c Percent_of_oocytes_viable = BETA(3.06, 2.95, 602)*38.9+61.1
UNITS: Dimensionless
VALUE: 87.8864
: c Pool_waster_ingested_per_swim[Under_5_Years_Old, Large_pool] = BETA(2.26,4.66, 42)*0.154
UNITS: Litre/person
: c Pool_waster_ingested_per_swim[Under_5_Years_Old, Small_pool] = BETA(2.26,4.66, 43)*0.154
UNITS: Litre/person
: c Pool_waster_ingested_per_swim[Over_5_Years_Old, Large_pool] = BETA(2.71,4.66, 40)*0.053
UNITS: Litre/person
: c Pool_waster_ingested_per_swim[Over_5_Years_Old, Small_pool] = UNIFORM(0, 0.01, 41)
UNITS: Litre/person
UNITS: Litre/person
VALUE: 0.0873902, 0.0770611
VALUE: 0.0059315, 0.00976335
: c Probably_of_being_symptomatic_given_infection = BETA(2.16, 3.84, 3)*0.38+0.5
UNITS: Dimensionless
VALUE: 0.562138
: c Rate_of_symptomatic_travellers = BETA(2.16, 3.84, 141)*0.38+0.5
UNITS: Per Day
VALUE: 0.637378
: c Relapse_Rate = BETA(1.84, 4.06, 8)*0.62+0.18
UNITS: Dimensionless
VALUE: 0.238205
: c awareness_delay[Under_5_Years_Old] = BETA(1.66, 4.33, 27)*(7-1)+1
UNITS: days
: c awareness_delay[Over_5_Years_Old] = BETA(1.89, 4.11, 28)*(10-9)+1
UNITS: days

UNITS: days
VALUE: 2.13488, 1.50546
: c duration_of_symptoms = BETA(2.04,3.31, 4)*27+1
UNITS: days
VALUE: 12.9618
: c faecal_testing_delay = UNIFORM(1, 5, 25)
UNITS: days
VALUE: 2.98979
: c Incubation_Period = BETA(4.3, 3.6, 99)*11+1
UNITS: days
VALUE: 7.31
: c "Log-3_disinfection_LP"[PHU, Large_Pool_number] = BETA(2.47,3.53, 44)*1.465+1.16
UNITS: days
VALUE: 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297
VALUE: 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297
VALUE: 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297, 1.61297
: c notification_delay = LOGNORMAL(6.29, 4.65, 33)
UNITS: days
VALUE: 6.25121
: c oocyte_inactivation_LP[PHU, Large_Pool_number] = UNIFORM(2,10, 44)
UNITS: days
VALUE: 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713
VALUE: 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713
VALUE: 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713, 4.58713
: c "Post-symptom_infectious_period" = BETA(2.69,3.31, 9)*13+1
UNITS: days
VALUE: 2.50114
: c Reinfection_delay = BETA(1.5,4.5, 5)*8+2
UNITS: days
VALUE: 4.00987
: c relapse_duration = BETA(1.28, 4.71, 7)*14+1
UNITS: Days
VALUE: 3.13903
: c treatment_seeking_delay = BETA(1.3, 4.69, 23)*26+1
UNITS: Days
VALUE: 12.4178
: f Daily_population_change_rate[PHU, Age] = daily_population_change[PHU, Age]
UNITS: persons/day
VALUE: -0.0246575, 0.075
VALUE: -13545, -0.424658
VALUE: 0.161644, 0.117808
: c predicted_people_with_crypto_tested[Age, PHU] =
(PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age,PHU]*fraction_of_people_tested[Age,PHU])*(fraction_of_tests_submitt
ed)
UNITS: Persons
VALUE: 0.0579101, 0.0579101, 0.0579101
VALUE: 0.0579101, 0.0579101, 0.0579101
: c testing_gap[Age, PHU] = predicted_people_with_crypto_tested[Age,PHU]-PEOPLE_WITH_CRYPTO_TESTED[Age,PHU]
UNITS: persons
VALUE: -0.14209, -0.14209, -0.14209
VALUE: -0.14209, -0.14209, -0.14209
: f faecal_testing_rate[Age, PHU] = testing_gap[Age,PHU]/faecal_testing_delay
UNITS: person/day
VALUE: -0.0475251, -0.0475251, -0.0475251
VALUE: -0.0475251, -0.0475251, -0.0475251
: c predicted_people_with_crypto_going_to_doctor[Age, PHU] =
SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU,Age]*health_seeking_fraction[PHU,Age]
UNITS: persons
VALUE: 0.525245, 0.525245, 0.525245
VALUE: 0.525245, 0.525245, 0.525245
: c healthcare_seeking_gap[Age, PHU] = predicted_people_with_crypto_going_to_doctor[Age,PHU]-
PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age,PHU]
UNITS: persons
VALUE: -0.074755, -0.074755, -0.074755
VALUE: -0.074755, -0.074755, -0.074755
: f healthcare_seeking_rate[Age, PHU] = healthcare_seeking_gap[Age,PHU]/treatment_seeking_delay

UNITS: person/day
VALUE: -0.00602001, -0.00602001, -0.00602001
VALUE: -0.00602001, -0.00602001, -0.00602001
: c testing_transition = TIME
UNITS: Dimensionless
VALUE: 0
: c positive_crypto_cases[Age, PHU] =
((PEOPLE_WITH_CRYPTO_TESTED[Age,PHU]*testing_transition)*PCR_sensitivity[PHU])+((PEOPLE_WITH_CRYPTO_T
ESTED[Age,PHU]*(1-testing_transition)*microscopy_sensitivity[PHU]))
UNITS: persons
VALUE: 0.105321, 0.105321, 0.105321
VALUE: 0.105321, 0.105321, 0.105321
: c Notification_Gap[PHU, Age] = positive_crypto_cases[Age, PHU]-NOTIFIED_CRYPTO_CASES[PHU,Age]
UNITS: persons
VALUE: 0.104321, 0.104321
VALUE: 0.104321, 0.104321
VALUE: 0.104321, 0.104321
: f notifying[PHU, Age] = Notification_Gap[PHU,Age]/notification_delay
UNITS: person/day
VALUE: 0.0166882, 0.0166882
VALUE: 0.0166882, 0.0166882
VALUE: 0.0166882, 0.0166882
: f Asymptomatic_infection[PHU, Age] = (LATENTLY_INFECTED_PEOPLE[PHU, Age]*(1-
Probably_of_being_symptomatic_given_infection))/Incubation_Period
UNITS: persons/day
VALUE: 0.0838933, 0.0838933
VALUE: 0.0838933, 0.0838933
VALUE: 0.0838933, 0.0838933
: f asymptomatic_returning[PHU, Age] = EXPOSED_TRAVELLERS[PHU, Age]*(1-Rate_of_symptomatic_travellers)
UNITS: persons/day
VALUE: 0.0725244, 1.12413
VALUE: 0.0725244, 1.30544
VALUE: 0, 0.688982
: f Asymptopatic_recovery[PHU, Age] = ASYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age]/"Post-
symptom_infectious_period"
UNITS: persons/day
VALUE: 1.15148, 1.15148
VALUE: 1.15148, 1.15148
VALUE: 1.15148, 1.15148
: c Fraction_made_aware_sens_variable = 43
UNITS: Dimensionless
VALUE: 43%
: c fraction_of_positive_cases_made_aware[Age] = Fraction_made_aware_sens_variable
UNITS: Dimensionless
VALUE: 43%, 43%
: c predicted_aware_infectious_people[Age, PHU] =
positive_crypto_cases[Age,PHU]*((fraction_of_positive_cases_made_aware[Age]/100)+Healthcare_Messaging_effect[PHU,Age
])
UNITS: persons
VALUE: 0.0452882, 0.0452882, 0.0452882
VALUE: 0.0452882, 0.0452882, 0.0452882
: f Aware_diagnosed_cases[Age, PHU] = (predicted_aware_infectious_people[Age,PHU]/awareness_delay[Age])
UNITS: person/day
VALUE: 0.0212134, 0.0212134, 0.0212134
VALUE: 0.0300827, 0.0300827, 0.0300827
: f symptomatic_returning[PHU, Age] = (EXPOSED_TRAVELLERS[PHU, Age]*Rate_of_symptomatic_travellers)
UNITS: persons/day
VALUE: 0.127476, 1.97587
VALUE: 0.127476, 2.29456
VALUE: 0, 1.21102
: c Traveller_screening_sens_variable = 0
UNITS: Dimensionless
VALUE: 0%
: c Percent_of_sympotmatic_travellers_screened_out = 0+Traveller_screening_sens_variable
UNITS: Dimensionless
VALUE: 0

: f Aware_imported_cases[Age, PHU] =
symptomatic_returning[PHU,Age]*(Percent_of_sympotmatic_travellers_screened_out/100)
UNITS: person/day
VALUE: 0, 0, 0
VALUE: 0, 0, 0
: c Physician_precautionary_advice_sense_variable = 5
UNITS: Dimensionless
VALUE: 5%
: c physician_precautionary_advice_fraction[Age] = Physician_precautionary_advice_sense_variable
UNITS: Dimensionless
VALUE: 5%, 5%
: c people_not_tested_but_aware[Age, PHU] = (PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age,PHU]*(1-
(fraction_of_people_tested*fraction_of_tests_submitted)))*((physician_precautionary_advice_fraction[Age]/100)+(Healthcare_M
essaging_effect[PHU,Age]))
UNITS: persons
VALUE: 0.0271045, 0.0271045, 0.0271045
VALUE: 0.0271045, 0.0271045, 0.0271045
: c informal_awareness_delay = 1
UNITS: 1/day
VALUE: 1
: f Aware_suspected_cases[Age, PHU] = people_not_tested_but_aware/informal_awareness_delay
UNITS: person/day
VALUE: 0.0271045, 0.0271045, 0.0271045
VALUE: 0.0271045, 0.0271045, 0.0271045
: c total_symptomatic_people[PHU, Age] = RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE +
RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE + SYMPTOMATIC_INFECTIOUS_PEOPLE
UNITS: persons
VALUE: 5.2, 5.2
VALUE: 5.2, 5.2
VALUE: 5.2, 5.2
: f aware_unconsulted_cases[Age, PHU] = ((total_symptomatic_people[PHU,Age]-
AWARE_INFECTIOUS_PEOPLE[Age,PHU])*Messaging_behaviour_change_proportion[PHU,Age])
UNITS: person/day
VALUE: 0, 0, 0
VALUE: 0, 0, 0
: c "3-log_disinfection_sens_variable"[Large_pool] = 0
UNITS: Dimensionless
: c "3-log_disinfection_sens_variable"[Small_pool] = 0
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0, 0
: c Disinfectant_type_switch_LP = 0+"3-log_disinfection_sens_variable"[Large_pool]
UNITS: Dimensionless
VALUE: 0
: f Removal_LP[PHU, Large_Pool_number] = IF Disinfectant_type_switch_LP = 1 THEN
(Oocytes_in_the_large_pool[PHU,Large_Pool_number]/"Log-3_disinfection_LP") ELSE
(Oocytes_in_the_large_pool[PHU,Large_Pool_number]/oocyte_inactivation_LP[PHU,Large_Pool_number])
UNITS: oocytes/day
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: c Reactionary_hyperchlorination_LP[PHU, Large_Pool_number] = IF AFR_LP.oocytes_released_into_LP[PHU,
Large_Pool_number] >0 AND AFR_detected_LP[Large_Pool_number]>0 THEN 1 ELSE 0
UNITS: Dimensionless
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: c routine_hyperchloronation_switch_sens_variable = 0
UNITS: Dimensionless
VALUE: 0
: c Routine_hyperchlorination_switch_LP = 0+routine_hyperchloronation_switch_sens_variable
UNITS: Dimensionless
VALUE: 0
: c routine_hyperchloronation_frequency_sens_variable = 90
UNITS: Dimensionless
VALUE: 90 days

: c Routine_hyperchlorination_frequency_LP = 0+routine_hyperchloronation_frequency_sens_variable
UNITS: Dimensionless
VALUE: 90
: c Routine_hyperchlorination_LP[PHU, Large_Pool_number] = (PULSE (Routine_hyperchlorination_switch_LP, Routine_hyperchlorination_frequency_LP, Routine_hyperchlorination_frequency_LP))*DT
UNITS: Dimensionless
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: f Decontamination_LP[PHU, Large_Pool_number] = IF Reactionary_hyperchlorination_LP[PHU,Large_Pool_number] = 1 THEN ((Oocytes_in_the_large_pool[PHU,Large_Pool_number]/DT)+(Contamination_LP-Removal_LP[PHU,Large_Pool_number])) ELSE IF Routine_hyperchlorination_LP[PHU,Large_Pool_number]= 1 THEN ((Oocytes_in_the_large_pool[PHU,Large_Pool_number]/DT)+(Contamination_LP-Removal_LP[PHU,Large_Pool_number])) ELSE 0
UNITS: oocytes/day
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: c Disinfectant_type_switch_SP = 0+"3-log_disinfection_sens_variable"[Small_pool]
UNITS: Dimensionless
VALUE: 0
: f Removal_SP[PHU, Small_pool_number] = IF Disinfectant_type_switch_SP= 1 THEN (Oocytes_in_the_small_pool[PHU,Small_pool_number]/"Log-3_disinfection_SP") ELSE IF Disinfectant_type_switch_SP = 2 THEN (Oocytes_in_the_small_pool[PHU,Small_pool_number]/"Log-3_disinfection_SP_highest_risk_only"[Small_pool_number]) ELSE (Oocytes_in_the_small_pool[PHU,Small_pool_number]/oocyte_inactivation_SP[PHU,Small_pool_number])
UNITS: oocytes/day
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
: c Reactionary_hyperchlorination_SP[PHU, Small_pool_number] = IF (AFR_SP.oocytes_released_into_SP[PHU,Small_pool_number]>0 AND AFR_detected_SP[Small_pool_number]>0) THEN 1 ELSE 0
UNITS: Dimensionless
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
: c Routine_hyperchlorination_switch_SP = 0+routine_hyperchloronation_switch_sens_variable
UNITS: Dimensionless
VALUE: 0
: c Routine_hyperchlorination_frequency_SP = 0+routine_hyperchloronation_frequency_sens_variable
UNITS: Dimensionless
VALUE: 90
: c Routine_hyperchlorination_SP[PHU, Small_pool_number] = (PULSE (Routine_hyperchlorination_switch_SP , Routine_hyperchlorination_frequency_SP, Routine_hyperchlorination_frequency_SP))*DT
UNITS: Dimensionless
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
: f Decontamination_SP[PHU, Small_pool_number] = IF Reactionary_hyperchlorination_SP[PHU,Small_pool_number] = 1 THEN ((Oocytes_in_the_small_pool[PHU,Small_pool_number]/DT)+(Contamination_SP-Removal_SP[PHU,Small_pool_number])) ELSE IF Routine_hyperchlorination_SP[PHU,Small_pool_number] = 1 THEN ((Oocytes_in_the_small_pool[PHU,Small_pool_number]/DT)+(Contamination_SP-Removal_SP[PHU,Small_pool_number])) ELSE 0
UNITS: oocytes/day
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
: c Daily_departures[Under_5_Years_Old] = TIME
UNITS: persons/day
: c Daily_departures[Over_5_Years_Old] = TIME
UNITS: persons/day
UNITS: persons/day
VALUE: 232, 6251
: c SEQ_fraction[Metro_North, Under_5_Years_Old] = 0.1935
UNITS: Dimensionless

: c SEQ_fraction[Metro_North, Over_5_Years_Old] = 0.2009
UNITS: Dimensionless
: c SEQ_fraction[Metro_South, Under_5_Years_Old] = 0.2404
UNITS: Dimensionless
: c SEQ_fraction[Metro_South, Over_5_Years_Old] = 0.2282
UNITS: Dimensionless
: c SEQ_fraction[Gold_Coast, Under_5_Years_Old] = 0.1134
UNITS: Dimensionless
: c SEQ_fraction[Gold_Coast, Over_5_Years_Old] = 0.1216
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0.1935, 0.2009
VALUE: 0.2404, 0.2282
VALUE: 0.1134, 0.1216
: f departing[PHU, Age] = (Daily_departures[Age]*SEQ_fraction[PHU, Age])
UNITS: persons/day
VALUE: 44.892, 1255.83
VALUE: 55.7728, 1426.48
VALUE: 26.3088, 760.122
: f Exposure[PHU, Age] = 1
UNITS: persons/day
VALUE: 0.133333, 0.133333
VALUE: 0.133333, 0.133333
VALUE: 0.133333, 0.133333
: c proportion_of_low_risk_travellers[Under_5_Years_Old] = TIME
UNITS: Dimensionless
: c proportion_of_low_risk_travellers[Over_5_Years_Old] = TIME
UNITS: Dimensionless
UNITS: Dimensionless
VALUE: 0.634097, 0.630387
: f "high-risk_exposure"[PHU, Age] = ((TRAVELLERS[PHU, Age]*(1-proportion_of_low_risk_travellers[Age])*(high_risk_infection_rate))+(TRAVELLERS[PHU, Age]*proportion_of_low_risk_travellers[Age]*(low_risk_infection_rate)))/length_of_travel[PHU]
UNITS: persons/day
VALUE: 0.0347019, 0.971677
VALUE: 0.0431262, 1.10376
VALUE: 0.0203265, 0.588129
: f Symptomatic_infection[PHU, Age] = (LATENTLY_INFECTED_PEOPLE[PHU, Age]*Probably_of_being_symptomatic_given_infection)/Incubation_Period
UNITS: persons/day
VALUE: 0.107704, 0.107704
VALUE: 0.107704, 0.107704
VALUE: 0.107704, 0.107704
: c Total_new_infections[PHU, Age] = SUM(Asymptomatic_infection[*,*]) + SUM(Symptomatic_infection[*,*]) + asymptomatic_returning + symptomatic_returning
UNITS: persons/day
VALUE: 1.34958, 4.24958
VALUE: 1.34958, 4.74958
VALUE: 1.14958, 3.04958
: c Potential_infectors[Age, PHU] = Total_new_infections[PHU,Age]
UNITS: persons/day
VALUE: 1.34958, 1.34958, 1.14958
VALUE: 4.24958, 4.74958, 3.04958
: c New_secondary_cases[Under_5_Years_Old, Metro_North] = ((Potential_infectors[Under_5_Years_Old,Metro_North]/Child_secondary_transmission_rate[Metro_North])*0.25)+((Potential_infectors[Over_5_Years_Old, Metro_North]/Adult_secondary_transmission_rate[Metro_North])*0.5)
UNITS: persons/day
: c New_secondary_cases[Under_5_Years_Old, Metro_South] = ((Potential_infectors[Under_5_Years_Old,Metro_South]/Child_secondary_transmission_rate[Metro_South])*0.25)+((Potential_infectors[Over_5_Years_Old, Metro_South]/Adult_secondary_transmission_rate[Metro_South])*0.5)
UNITS: persons/day
: c New_secondary_cases[Under_5_Years_Old, Gold_Coast] = ((Potential_infectors[Under_5_Years_Old,Gold_Coast]/Child_secondary_transmission_rate[Gold_Coast])*0.25)+((Potential_infectors[Over_5_Years_Old, Gold_Coast]/Adult_secondary_transmission_rate[Gold_Coast])*0.5)
UNITS: persons/day

: c New_secondary_cases[Over_5_Years_Old, Metro_North] =
((Potential_infectors[Under_5_Years_Old,Metro_North]/Child_secondary_transmission_rate[Metro_North])*0.75)+((Potential_infectors[Over_5_Years_Old,Metro_North]/Adult_secondary_transmission_rate[Metro_North])*0.5)
UNITS: persons/day
: c New_secondary_cases[Over_5_Years_Old, Metro_South] =
((Potential_infectors[Under_5_Years_Old,Metro_South]/Child_secondary_transmission_rate[Metro_South])*0.75)+((Potential_infectors[Over_5_Years_Old,Metro_South]/Adult_secondary_transmission_rate[Metro_South])*0.5)
UNITS: persons/day
: c New_secondary_cases[Over_5_Years_Old, Gold_Coast] =
((Potential_infectors[Under_5_Years_Old,Gold_Coast]/Child_secondary_transmission_rate[Gold_Coast])*0.75)+((Potential_infectors[Over_5_Years_Old,Gold_Coast]/Adult_secondary_transmission_rate[Gold_Coast])*0.5)
UNITS: persons/day
UNITS: persons/day
VALUE: 0.0601738, 0.0657635, 0.0448815
VALUE: 0.0855059, 0.0910956, 0.0664596
: c SA_sensitivity = 1
UNITS: Dimensionless
VALUE: 1
: f "pre-infection_contacts"[Age, PHU] = New_secondary_cases[Age,PHU]*SA_sensitivity
UNITS: persons/day
VALUE: 0.0601738, 0.0657635, 0.0448815
VALUE: 0.0855059, 0.0910956, 0.0664596
: f Recovery_rate[Age, PHU] = AWARE_INFECTIOUS_PEOPLE[Age,PHU]/(duration_of_symptoms+"Post-symptom_infectious_period")
UNITS: person/day
VALUE: 0, 0, 0
VALUE: 0, 0, 0
: f Relapse_recovery[PHU, Age] = RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]/relapse_duration
UNITS: persons/day
VALUE: 0.363169, 0.363169
VALUE: 0.363169, 0.363169
VALUE: 0.363169, 0.363169
: f Relapsing[PHU, Age] = RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]*Relapse_Rate/Reinfection_delay
UNITS: persons/day
VALUE: 0.0700973, 0.0700973
VALUE: 0.0700973, 0.0700973
VALUE: 0.0700973, 0.0700973
: f returning_uninfected[PHU, Age] = ((TRAVELLERS[PHU, Age]*proportion_of_low_risk_travellers[Age]*(1-low_risk_infection_rate))+((TRAVELLERS[PHU, Age]*(1-proportion_of_low_risk_travellers[Age])*(1-high_risk_infection_rate))))/length_of_travel[PHU]
UNITS: persons/day
VALUE: 9.72341, 271.951
VALUE: 12.0839, 308.917
VALUE: 5.69545, 164.604
: f symptomatic_recovery[PHU, Age] = (RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]*(1-Relapse_Rate)/"Post-symptom_infectious_period")
UNITS: persons/day
VALUE: 0.359404, 0.359404
VALUE: 0.359404, 0.359404
VALUE: 0.359404, 0.359404
: f symptoms_waning[PHU, Age] = SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age]/duration_of_symptoms
UNITS: persons/day
VALUE: 0.222192, 0.222192
VALUE: 0.222192, 0.222192
VALUE: 0.222192, 0.222192
: c length_of_immunity = 1
UNITS: Days
VALUE: 1
: f Waning_immunity[PHU, Age] = RECOVERED_PEOPLE[PHU, Age]/length_of_immunity
UNITS: persons/day
VALUE: 0.5, 0.5
VALUE: 0.5, 0.5
VALUE: 0.5, 0.5
: f Avoided_cases[Age, PHU] = LEAKAGE OUTFLOW
LEAK ZONE = 0% to 100%

UNITS: persons/day
VALUE: 0, 0, 0
VALUE: 0, 0, 0
: f Secondary_transmission[Age, PHU] = CONVEYOR OUTFLOW
UNITS: persons/day
VALUE: 0.133333, 0.133333, 0.133333
VALUE: 0.133333, 0.133333, 0.133333
: c LP_volume[LP_1] = 375000
UNITS: Litre
: c LP_volume[LP_2] = 375000
UNITS: Litre
: c LP_volume[LP_3] = 375000
UNITS: Litre
: c LP_volume[LP_4] = 468750
UNITS: Litre
: c LP_volume[LP_5] = 468750
UNITS: Litre
: c LP_volume[LP_6] = 468750
UNITS: Litre
: c LP_volume[LP_7] = 2500000
UNITS: Litre
: c LP_volume[LP_8] = 2500000
UNITS: Litre
: c LP_volume[LP_9] = 2500000
UNITS: Litre
: c LP_volume[LP_10] = 2500000
UNITS: Litre
UNITS: Litre
VALUE: 375000, 375000, 375000, 468750, 468750, 468750, 2.5e+06, 2.5e+06, 2.5e+06, 2.5e+06
: c oocytes_per_Litre_in_LPs[PHU, Large_Pool_number] =
Oocytes_in_the_large_pool[PHU,Large_Pool_number]/LP_volume[Large_Pool_number]
UNITS: oocytes/Litre
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: c Crypto_dose_in_LPs[PHU, Age, Large_Pool_number] =
(oocytes_per_Litre_in_LPs[PHU,Large_Pool_number]*(Percent_of_oocytes_viable/100))*Pool_waster_ingested_per_swim[Age,
Large_pool]
UNITS: oocytes/person
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
: c SP_volume[SP_1] = 205200
UNITS: Litre
: c SP_volume[SP_2] = 205200
UNITS: Litre
: c SP_volume[SP_3] = 116600
UNITS: Litre
: c SP_volume[SP_4] = 69570
UNITS: Litre
: c SP_volume[SP_5] = 69570
UNITS: Litre
UNITS: Litre
VALUE: 205200, 205200, 116600, 69570, 69570
: c oocytes_per_Litre_in_SPs[PHU, Small_pool_number] =
Oocytes_in_the_small_pool[PHU,Small_pool_number]/SP_volume[Small_pool_number]
UNITS: oocytes/Litre
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
: c Crypto_dose_in_SPs[PHU, Age, Small_pool_number] =
(oocytes_per_Litre_in_SPs[PHU,Small_pool_number]*(Percent_of_oocytes_viable/100))*Pool_waster_ingested_per_swim[Age,
Small_pool]

UNITS: oocytes/person
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
VALUE: 0, 0, 0, 0, 0
: c total_infectious_people_per_PHU[PHU] = SUM(Total_Infectious_People[PHU,*])
UNITS: persons
VALUE: 16.16, 16.16, 16.16
: c Grand_total_infectious_people = SUM(total_infectious_people_per_PHU)
UNITS: persons
VALUE: 48.48
: c Healthy_Swimmers.Susceptible_swimmers[PHU, Age] = .SUSCEPTIBLE_PEOPLE[PHU, Age]*.Portion_of_population_who_swim[Age]
UNITS: persons
VALUE: 3272.52, 47594.2
VALUE: 4079.86, 54136.2
VALUE: 1853.56, 27519.5
: c Healthy_Swimmers.Daily_susceptible_Swimmers[PHU, Age] = .Daily_Swimming_frequency*(Susceptible_swimmers[PHU, Age]*.Seasonal_converter[Age])
UNITS: persons/day
VALUE: 281.842, 2186.13
VALUE: 351.373, 2486.62
VALUE: 159.636, 1264.05
: c Healthy_Swimmers.susceptible_child_swimmers[PHU] = Daily_susceptible_Swimmers[PHU,Under_5_Years_Old]
UNITS: persons/day
VALUE: 281.842, 351.373, 159.636
: c Healthy_Swimmers.percent_of_children_using_LP = 0.25
UNITS: Dimensionless
VALUE: 0.25
: c Healthy_Swimmers.healthy_children_in_LP[PHU] = susceptible_child_swimmers[PHU]*percent_of_children_using_LP
UNITS: persons/day
VALUE: 70.4604, 87.8432, 39.9089
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_North, Under_5_Years_Old] = healthy_children_in_LP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_North, Over_5_Years_Old] = healthy_adults_in_LP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_South, Under_5_Years_Old] = healthy_children_in_LP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_South, Over_5_Years_Old] = healthy_adults_in_LP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Gold_Coast, Under_5_Years_Old] = healthy_children_in_LP[Gold_Coast]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Gold_Coast, Over_5_Years_Old] = healthy_adults_in_LP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
VALUE: 70.4604, 2076.82
VALUE: 87.8432, 2362.29
VALUE: 39.9089, 1200.84
: c healthy_swimmers_in_each_LP[PHU, Large_Pool_number, Age] = Healthy_Swimmers.Healthy_People_in_LP[PHU, Age]*Users_in_each_LP[Large_Pool_number]
UNITS: persons/day
VALUE: 0, 0
VALUE: 7.04604, 207.682
VALUE: 7.04604, 207.682
VALUE: 7.04604, 207.682
VALUE: 7.04604, 207.682
VALUE: 0, 0
VALUE: 14.0921, 415.365
VALUE: 14.0921, 415.365
VALUE: 14.0921, 415.365
VALUE: 0, 0
VALUE: 0, 0
VALUE: 8.78432, 236.229
VALUE: 8.78432, 236.229

VALUE: 8.78432, 236.229
VALUE: 8.78432, 236.229
VALUE: 0, 0
VALUE: 17.5686, 472.458
VALUE: 17.5686, 472.458
VALUE: 17.5686, 472.458
VALUE: 0, 0
VALUE: 0, 0
VALUE: 3.99089, 120.084
VALUE: 3.99089, 120.084
VALUE: 3.99089, 120.084
VALUE: 3.99089, 120.084
VALUE: 0, 0
VALUE: 7.98178, 240.169
VALUE: 7.98178, 240.169
VALUE: 7.98178, 240.169
VALUE: 0, 0
: c Healthy_Swimmers.susceptible_adult_swimmers[PHU] = Daily_susceptible_Swimmers[PHU,Over_5_Years_Old]
UNITS: persons/day
VALUE: 2186.13, 2486.62, 1264.05
: c Healthy_Swimmers.percent_of_adults_using_SP = 0.05
UNITS: Dimensionless
VALUE: 0.05
: c Healthy_Swimmers.healthy_adults_in_LP[PHU] = susceptible_adult_swimmers[PHU]*(1-percent_of_adults_using_SP)
UNITS: persons/day
VALUE: 2076.82, 2362.29, 1200.84
: c Healthy_Swimmers.Healthy_children_in_SP[PHU] = susceptible_child_swimmers[PHU]*(1-percent_of_children_using_LP)
UNITS: persons/day
VALUE: 211.381, 263.53, 119.727
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_North, Under_5_Years_Old] = Healthy_children_in_SP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_North, Over_5_Years_Old] = Healthy_adults_in_SP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_South, Under_5_Years_Old] = Healthy_children_in_SP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_South, Over_5_Years_Old] = Healthy_adults_in_SP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Gold_Coast, Under_5_Years_Old] = Healthy_children_in_SP[Gold_Coast]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Gold_Coast, Over_5_Years_Old] = Healthy_adults_in_SP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
VALUE: 211.381, 109.307
VALUE: 263.53, 124.331
VALUE: 119.727, 63.2023
: c healthy_swimmers_in_each_SP[PHU, Small_pool_number, Age] = Healthy_Swimmers.Healthy_People_in_SP[PHU,
Age]*Users_in_each_SP[Small_pool_number]
UNITS: persons/day
VALUE: 0, 0
VALUE: 105.691, 54.6533
VALUE: 63.4143, 32.792
VALUE: 21.1381, 10.9307
VALUE: 21.1381, 10.9307
VALUE: 0, 0
VALUE: 131.765, 62.1655
VALUE: 79.0589, 37.2993
VALUE: 26.353, 12.4331
VALUE: 26.353, 12.4331
VALUE: 0, 0
VALUE: 59.8633, 31.6011
VALUE: 35.918, 18.9607
VALUE: 11.9727, 6.32023
VALUE: 11.9727, 6.32023
: c Healthy_Swimmers.Healthy_adults_in_SP[PHU] = susceptible_adult_swimmers[PHU]*(percent_of_adults_using_SP)
UNITS: persons/day
VALUE: 109.307, 124.331, 63.2023

: c Probability_of_infection_per_swim_event_LP[PHU, Large_Pool_number, Age] = 1-EXP(-Crypto_dose_in_LPs[PHU,Age,Large_Pool_number]*Dose_response_parameter[PHU])
UNITS: Dimensionless
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
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VALUE: 0, 0
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VALUE: 0, 0
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VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
: c New_cases_from_LP[PHU, Large_Pool_number, Age] = Probability_of_infection_per_swim_event_LP[PHU, Large_Pool_number, Age]*healthy_swimmers_in_each_LP[PHU, Large_Pool_number, Age]
UNITS: persons/day
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
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VALUE: 0, 0
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VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0

: c Probability_of_infection_per_swim_event_SP[PHU, Small_pool_number, Age] = 1-EXP(-Crypto_dose_in_SPs[PHU, Age,Small_pool_number]*Dose_response_parameter[PHU])
UNITS: Dimensionless
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
: c New_cases_from_SPs[PHU, Small_pool_number, Age] = Probability_of_infection_per_swim_event_SP[PHU, Small_pool_number, Age]*healthy_swimmers_in_each_SP[PHU, Small_pool_number, Age]
UNITS: persons/day
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0
: c New_person_to_person_cases[Age, PHU] = Secondary_transmission[Age,PHU]
UNITS: persons/day
VALUE: 0.133333, 0.133333, 0.133333
VALUE: 0.133333, 0.133333, 0.133333
: c Swimming_cases_sensitivity_parameter = 0
UNITS: Dimensionless
VALUE: 0
: c New_swimming_related_cases[PHU, Age] = (SUM(New_cases_from_SPs[PHU, *, Age])+SUM(New_cases_from_LP[PHU, *, Age]))+((SUM(New_cases_from_SPs[PHU, *, Age])+SUM(New_cases_from_LP[PHU, *, Age]))*(Swimming_cases_sensitivity_parameter/100))
UNITS: persons/day
VALUE: 0, 0
VALUE: 0, 0
VALUE: 0, 0

{ RUNTIME EQUATIONS }
: S AWARE_INFECTIOUS_PEOPLE[Age, PHU](t) = AWARE_INFECTIOUS_PEOPLE[Age, PHU](t - dt) + (Aware_diagnosed_cases[Age, PHU] + Aware_suspected_cases[Age, PHU] + aware_unconsulted_cases[Age, PHU] + Aware_imported_cases[Age, PHU] - Recovery_rate[Age, PHU]) * dt
UNITS: persons
: S ASYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age](t) = ASYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age](t - dt) + (Asymptomatic_infection[PHU, Age] + asymptomatic_returning[PHU, Age] - Asymptopatic_recovery[PHU, Age]) * dt
UNITS: persons
: S RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age](t) = RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age](t - dt) + (symptoms_waning[PHU, Age] + Relapse_recovery[PHU, Age] - symptomatic_recovery[PHU, Age] - Relapsing[PHU, Age]) * dt
UNITS: persons
: S RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age](t) = RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age](t - dt) + (Relapsing[PHU, Age] - Relapse_recovery[PHU, Age]) * dt

UNITS: persons
: S SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age](t) = SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age](t - dt) + (Symptomatic_infection[PHU, Age] + symptomatic_returning[PHU, Age] - symptoms_waning[PHU, Age]) * dt
UNITS: persons
: s Oocytes_in_the_large_pool[PHU, Large_Pool_number](t) = Oocytes_in_the_large_pool[PHU, Large_Pool_number](t - dt) + (Contamination_LP[PHU, Large_Pool_number] - Removal_LP[PHU, Large_Pool_number] - Decontamination_LP[PHU, Large_Pool_number]) * dt {NON-NEGATIVE}
UNITS: oocytes
: s Oocytes_in_the_small_pool[PHU, Small_pool_number](t) = Oocytes_in_the_small_pool[PHU, Small_pool_number](t - dt) + (Contamination_SP[PHU, Small_pool_number] - Removal_SP[PHU, Small_pool_number] - Decontamination_SP[PHU, Small_pool_number]) * dt {NON-NEGATIVE}
UNITS: oocytes
: S EXPOSED_TRAVELLERS[Metro_North, Under_5_Years_Old](t) = EXPOSED_TRAVELLERS[Metro_North, Under_5_Years_Old](t - dt) + ("high-risk_exposure"[Metro_North, Under_5_Years_Old] - symptomatic_returning[Metro_North, Under_5_Years_Old] - asymptomatic_returning[Metro_North, Under_5_Years_Old]) * dt
UNITS: persons
: S EXPOSED_TRAVELLERS[Metro_North, Over_5_Years_Old](t) = EXPOSED_TRAVELLERS[Metro_North, Over_5_Years_Old](t - dt) + ("high-risk_exposure"[Metro_North, Over_5_Years_Old] - symptomatic_returning[Metro_North, Over_5_Years_Old] - asymptomatic_returning[Metro_North, Over_5_Years_Old]) * dt
UNITS: persons
: S EXPOSED_TRAVELLERS[Metro_South, Under_5_Years_Old](t) = EXPOSED_TRAVELLERS[Metro_South, Under_5_Years_Old](t - dt) + ("high-risk_exposure"[Metro_South, Under_5_Years_Old] - symptomatic_returning[Metro_South, Under_5_Years_Old] - asymptomatic_returning[Metro_South, Under_5_Years_Old]) * dt
UNITS: persons
: S EXPOSED_TRAVELLERS[Metro_South, Over_5_Years_Old](t) = EXPOSED_TRAVELLERS[Metro_South, Over_5_Years_Old](t - dt) + ("high-risk_exposure"[Metro_South, Over_5_Years_Old] - symptomatic_returning[Metro_South, Over_5_Years_Old] - asymptomatic_returning[Metro_South, Over_5_Years_Old]) * dt
UNITS: persons
: S EXPOSED_TRAVELLERS[Gold_Coast, Under_5_Years_Old](t) = EXPOSED_TRAVELLERS[Gold_Coast, Under_5_Years_Old](t - dt) + ("high-risk_exposure"[Gold_Coast, Under_5_Years_Old] - symptomatic_returning[Gold_Coast, Under_5_Years_Old] - asymptomatic_returning[Gold_Coast, Under_5_Years_Old]) * dt
UNITS: persons
: S EXPOSED_TRAVELLERS[Gold_Coast, Over_5_Years_Old](t) = EXPOSED_TRAVELLERS[Gold_Coast, Over_5_Years_Old](t - dt) + ("high-risk_exposure"[Gold_Coast, Over_5_Years_Old] - symptomatic_returning[Gold_Coast, Over_5_Years_Old] - asymptomatic_returning[Gold_Coast, Over_5_Years_Old]) * dt
UNITS: persons
UNITS: persons
: S LATENTLY_INFECTED_PEOPLE[PHU, Age](t) = LATENTLY_INFECTED_PEOPLE[PHU, Age](t - dt) + (Exposure[PHU, Age] - Symptomatic_infection[PHU, Age] - Asymptomatic_infection[PHU, Age]) * dt
UNITS: persons
: S NOTIFIED_CRYPTO_CASES[PHU, Age](t) = NOTIFIED_CRYPTO_CASES[PHU, Age](t - dt) + (notifying[PHU, Age]) * dt
UNITS: Persons
: S PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age, PHU](t) = PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age, PHU](t - dt) + (healthcare_seeking_rate[Age, PHU]) * dt
UNITS: persons
: S PEOPLE_WITH_CRYPTO_TESTED[Age, PHU](t) = PEOPLE_WITH_CRYPTO_TESTED[Age, PHU](t - dt) + (faecal_testing_rate[Age, PHU]) * dt
UNITS: persons
: S RECOVERED_PEOPLE[PHU, Age](t) = RECOVERED_PEOPLE[PHU, Age](t - dt) + (Asymptopatic_recovery[PHU, Age] + symptomatic_recovery[PHU, Age] - Waning_immunity[PHU, Age]) * dt
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Metro_North, Under_5_Years_Old](t) = SUSCEPTIBLE_PEOPLE[Metro_North, Under_5_Years_Old](t - dt) + (Waning_immunity[Metro_North, Under_5_Years_Old] + returning_uninfected[Metro_North, Under_5_Years_Old] + Daily_population_change_rate[Metro_North, Under_5_Years_Old] - Exposure[Metro_North, Under_5_Years_Old] - departing[Metro_North, Under_5_Years_Old]) * dt
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Metro_North, Over_5_Years_Old](t) = SUSCEPTIBLE_PEOPLE[Metro_North, Over_5_Years_Old](t - dt) + (Waning_immunity[Metro_North, Over_5_Years_Old] + returning_uninfected[Metro_North, Over_5_Years_Old] + Daily_population_change_rate[Metro_North, Over_5_Years_Old] - Exposure[Metro_North, Over_5_Years_Old] - departing[Metro_North, Over_5_Years_Old]) * dt
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Metro_South, Under_5_Years_Old](t) = SUSCEPTIBLE_PEOPLE[Metro_South, Under_5_Years_Old](t - dt) + (Waning_immunity[Metro_South, Under_5_Years_Old] + returning_uninfected[Metro_South, Under_5_Years_Old] + Daily_population_change_rate[Metro_South, Under_5_Years_Old] - Exposure[Metro_South, Under_5_Years_Old] - departing[Metro_South, Under_5_Years_Old]) * dt

UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Metro_South, Over_5_Years_Old](t) = SUSCEPTIBLE_PEOPLE[Metro_South, Over_5_Years_Old](t - dt) + (Waning_immunity[Metro_South, Over_5_Years_Old] + returning_uninfected[Metro_South, Over_5_Years_Old] + Daily_population_change_rate[Metro_South, Over_5_Years_Old] - Exposure[Metro_South, Over_5_Years_Old] - departing[Metro_South, Over_5_Years_Old]) * dt
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Gold_Coast, Under_5_Years_Old](t) = SUSCEPTIBLE_PEOPLE[Gold_Coast, Under_5_Years_Old](t - dt) + (Waning_immunity[Gold_Coast, Under_5_Years_Old] + returning_uninfected[Gold_Coast, Under_5_Years_Old] + Daily_population_change_rate[Gold_Coast, Under_5_Years_Old] - Exposure[Gold_Coast, Under_5_Years_Old] - departing[Gold_Coast, Under_5_Years_Old]) * dt
UNITS: persons
: S SUSCEPTIBLE_PEOPLE[Gold_Coast, Over_5_Years_Old](t) = SUSCEPTIBLE_PEOPLE[Gold_Coast, Over_5_Years_Old](t - dt) + (Waning_immunity[Gold_Coast, Over_5_Years_Old] + returning_uninfected[Gold_Coast, Over_5_Years_Old] + Daily_population_change_rate[Gold_Coast, Over_5_Years_Old] - Exposure[Gold_Coast, Over_5_Years_Old] - departing[Gold_Coast, Over_5_Years_Old]) * dt
UNITS: persons
UNITS: persons
: S TRAVELLERS[Metro_North, Under_5_Years_Old](t) = TRAVELLERS[Metro_North, Under_5_Years_Old](t - dt) + (departing[Metro_North, Under_5_Years_Old] - returning_uninfected[Metro_North, Under_5_Years_Old] - "high-risk_exposure"[Metro_North, Under_5_Years_Old]) * dt
UNITS: persons
: S TRAVELLERS[Metro_North, Over_5_Years_Old](t) = TRAVELLERS[Metro_North, Over_5_Years_Old](t - dt) + (departing[Metro_North, Over_5_Years_Old] - returning_uninfected[Metro_North, Over_5_Years_Old] - "high-risk_exposure"[Metro_North, Over_5_Years_Old]) * dt
UNITS: persons
: S TRAVELLERS[Metro_South, Under_5_Years_Old](t) = TRAVELLERS[Metro_South, Under_5_Years_Old](t - dt) + (departing[Metro_South, Under_5_Years_Old] - returning_uninfected[Metro_South, Under_5_Years_Old] - "high-risk_exposure"[Metro_South, Under_5_Years_Old]) * dt
UNITS: persons
: S TRAVELLERS[Metro_South, Over_5_Years_Old](t) = TRAVELLERS[Metro_South, Over_5_Years_Old](t - dt) + (departing[Metro_South, Over_5_Years_Old] - returning_uninfected[Metro_South, Over_5_Years_Old] - "high-risk_exposure"[Metro_South, Over_5_Years_Old]) * dt
UNITS: persons
: S TRAVELLERS[Gold_Coast, Under_5_Years_Old](t) = TRAVELLERS[Gold_Coast, Under_5_Years_Old](t - dt) + (departing[Gold_Coast, Under_5_Years_Old] - returning_uninfected[Gold_Coast, Under_5_Years_Old] - "high-risk_exposure"[Gold_Coast, Under_5_Years_Old]) * dt
UNITS: persons
: S TRAVELLERS[Gold_Coast, Over_5_Years_Old](t) = TRAVELLERS[Gold_Coast, Over_5_Years_Old](t - dt) + (departing[Gold_Coast, Over_5_Years_Old] - returning_uninfected[Gold_Coast, Over_5_Years_Old] - "high-risk_exposure"[Gold_Coast, Over_5_Years_Old]) * dt
UNITS: persons
UNITS: persons
: l SUSCEPTIBLE_CONTACTED_PEOPLE[Age, PHU](t) = SUSCEPTIBLE_CONTACTED_PEOPLE[Age, PHU](t - dt) + ("pre-infection_contacts"[Age, PHU] - Secondary_transmission[Age, PHU] - Avoided_cases[Age, PHU]) * dt {CONVEYOR}
UNITS: persons
: c Total_Infectious_People[PHU, Age] = ASYMPTOMATIC_INFECTIOUS_PEOPLE + RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE + RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE + SYMPTOMATIC_INFECTIOUS_PEOPLE
UNITS: persons
: c Proportion_of_cases_avoided[Age, PHU] = (AWARE_INFECTIOUS_PEOPLE[Age, PHU]/Total_Infectious_People[PHU,Age])
UNITS: Dimensionless
: c Sick_swimmers."Percent_of_infectious_swimmers_who_self-exclude"[PHU, Age] = .AWARE_INFECTIOUS_PEOPLE[Age, PHU]/.Total_Infectious_People[PHU,Age]
UNITS: Dimensionless
: c Sick_swimmers.Infectious_swimmers[PHU, Age] = (.Total_Infectious_People[PHU,Age]*.Portion_of_population_who_swim[Age])*(1-"Percent_of_infectious_swimmers_who_self-exclude"[PHU,Age])
UNITS: persons
: c Daily_Swimming_frequency[PHU, Age] = BETA(1.5, 4.5, 1)*0.79+0.008
UNITS: persons/person/day
: c CycleStartTime = INIT(TIME)
UNITS: Days
: c Time_cycle = COUNTER(CycleStartTime, CycleStartTime+CyclePeriod)
UNITS: day
: c Seasonal_converter[Under_5_Years_Old] = GRAPH(Time_cycle)

(1.0, 0.750), (35.0, 0.750), (63.0, 0.750), (98.0, 1.000), (126.0, 1.000), (154.0, 1.200), (189.0, 1.500), (217.0, 1.200), (245.0, 1.000), (280.0, 1.000), (308.0, 1.000), (343.0, 0.750), (365.0, 0.750)
UNITS: Dimensionless
: c Seasonal_converter[Over_5_Years_Old] = GRAPH(Time_cycle)
(1.0, 0.400), (35.0, 0.400), (63.0, 0.500), (98.0, 0.750), (126.0, 1.000), (154.0, 1.100), (189.0, 1.500), (217.0, 1.200), (245.0, 1.100), (280.0, 1.000), (308.0, 0.750), (343.0, 0.500), (365.0, 0.400)
UNITS: Dimensionless
UNITS: Dimensionless
: c Sick_swimmers.daily_infectious_swimmers[PHU, Age] = Infectious_swimmers[PHU,Age]*(.Daily_Swimming_frequency*.Seasonal_converter[Age])
UNITS: persons/day
: c Sick_swimmers.infectious_child_swimmers[PHU] = daily_infectious_swimmers[PHU,Under_5_Years_Old]
UNITS: persons/day
: c Sick_swimmers.Pool_CycleStartTime[Pool_type] = INIT(TIME)
UNITS: Days
: c Sick_swimmers.Pool_messaging_time_cycle[Pool_type] = COUNTER(Pool_CycleStartTime, Pool_CycleStartTime+PAF_messaging_cycle_period)
UNITS: Days
: c Sick_swimmers.Messaging_Converter[Pool_type] = IF Pool_messaging_time_cycle = Messaging_start_date AND PAF_messaging_switch = 1 THEN PULSE(PAF_Messaging_effectiveness, Messaging_start_date) ELSE 0
UNITS: 1/day
: c Sick_swimmers.PAF_Messaging[Pool_type] = DELAY1((Messaging_Converter[Pool_type]*PAF_Messaging_Effectiveness_Decay), PAF_Messaging_Effectiveness_Decay)
UNITS: Dimensionless
: c Sick_swimmers.children_in_LP[PHU] = (infectious_child_swimmers[PHU]*(1-PAF_Messaging[Large_pool]))*percent_of_children_using_LP
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Metro_North, Under_5_Years_Old] = children_in_LP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Metro_North, Over_5_Years_Old] = Adults_in_LP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Metro_South, Under_5_Years_Old] = children_in_LP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Metro_South, Over_5_Years_Old] = Adults_in_LP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Gold_Coast, Under_5_Years_Old] = children_in_LP[Gold_Coast]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_LP[Gold_Coast, Over_5_Years_Old] = Adults_in_LP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
: c Users_in_each_LP[Large_Pool_number] = IF Time_cycle <45 OR Time_cycle>300 THEN Seasonal_LP_users[Large_Pool_number,Winter] ELSE Seasonal_LP_users[Large_Pool_number,Summer]
UNITS: Dimensionless
: c Sick_swimmers_in_each_LP[PHU, Large_Pool_number, Age] = Sick_swimmers.Sick_People_in_LP[PHU, Age]*Users_in_each_LP[Large_Pool_number]
UNITS: persons/day
: c Grams_of_faeces_shed_by_children = BETA(1.05, 4.95, 74)*4.99+0.01
UNITS: gram/person
: c oocytes_in_1_gram_of_stool[PHU] = UNIFORM(50, 10^6, 71)
UNITS: oocytes/gram
: c Oocytes_from_shedding_swimmers[Metro_North, Under_5_Years_Old] = Grams_of_faeces_shed_by_children*oocytes_in_1_gram_of_stool[Metro_North]
UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Metro_North, Over_5_Years_Old] = Grams_of_faeces_shed_by_adults*oocytes_in_1_gram_of_stool[Metro_North]
UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Metro_South, Under_5_Years_Old] = Grams_of_faeces_shed_by_children*oocytes_in_1_gram_of_stool[Metro_South]
UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Metro_South, Over_5_Years_Old] = Grams_of_faeces_shed_by_adults*oocytes_in_1_gram_of_stool[Metro_South]
UNITS: oocytes/person
: c Oocytes_from_shedding_swimmers[Gold_Coast, Under_5_Years_Old] = Grams_of_faeces_shed_by_children*oocytes_in_1_gram_of_stool[Gold_Coast]
UNITS: oocytes/person

: c Oocytes_from_shedding_swimmers[Gold_Coast, Over_5_Years_Old] =
Grams_of_faeces_shed_by_adults*oocytes_in_1_gram_of_stool[Gold_Coast]
UNITS: oocytes/person
UNITS: oocytes/person
: c Percent_of_patrons_who_shower_LP[Age] = shower_sensitivity_variable
UNITS: Dimensionless
: c Oocyst_shed_by_LP_users[PHU, Large_Pool_number, Age] =
Sick_swimmers_in_each_LP*Oocytes_from_shedding_swimmers[PHU,Age] -
((Oocytes_from_shedding_swimmers[PHU,Age]*0.8)*(Sick_swimmers_in_each_LP*((Percent_of_patrons_who_shower_LP[Age]/100)+Sick_swimmers.PAF_Messaging[Large_pool])))
UNITS: oocytes/day
: c Sick_swimmers.infectious_adult_swimmers[PHU] = daily_infectious_swimmers[PHU,Over_5_Years_Old]
UNITS: persons/day
: c Sick_swimmers.Adults_in_LP[PHU] = (infectious_adult_swimmers[PHU]*(1-PAF_Messaging[Large_pool]))*(1-
percent_of_adults_using_SP)
UNITS: persons/day
: c Grams_of_faeces_shed_by_adults = UNIFORM(0.001, 0.1, 72)+0.1
UNITS: gram/person
: c Oocytes_shed_intoLP[PHU, Large_Pool_number] = SUM(Oocyst_shed_by_LP_users[PHU,Large_Pool_number, *])
UNITS: oocytes/day
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_1] = BETA(1.44, 4.56, 151)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_2] = BETA(1.44, 4.56, 152)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_3] = BETA(1.44, 4.56, 153)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_4] = BETA(1.44, 4.56, 154)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_5] = BETA(1.44, 4.56, 155)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_6] = BETA(1.44, 4.56, 156)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_7] = BETA(1.44, 4.56, 157)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_8] = BETA(1.44, 4.56, 158)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_9] = BETA(1.44, 4.56, 159)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Under_5_Years_Old, LP_10] = BETA(1.44, 4.56, 160)*0.045+0.0005
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_1] = BETA(2.77, 3.22, 161)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_2] = BETA(2.77, 3.22, 162)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_3] = BETA(2.77, 3.22, 163)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_4] = BETA(2.77, 3.22, 164)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_5] = BETA(2.77, 3.22, 165)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_6] = BETA(2.77, 3.22, 166)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_7] = BETA(2.77, 3.22, 167)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_8] = BETA(2.77, 3.22, 168)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_9] = BETA(2.77, 3.22, 169)*0.009+0.001
UNITS: AFR/Person
: c Probability_of_AFR_given_infection_LP[Over_5_Years_Old, LP_10] = BETA(2.77, 3.22, 170)*0.009+0.001
UNITS: AFR/Person
UNITS: AFR/Person
: c AFR_LP.AFR_per_day_in_large_pool[PHU, Large_Pool_number, Age] =
.Sick_swimmers_in_each_LP[PHU,Large_Pool_number, Age]
*(.Probability_of_AFR_given_infection_LP[Age,Large_Pool_number]+(.Probability_of_AFR_given_infection_LP[Age,Large_Pool_number] *(AFR_sensitivity_converter[Age]/100)))
UNITS: AFR/day

: c AFR_LP.AFR_LP[PHU, Large_Pool_number, Age] = BINOMIAL(1, AFR_per_day_in_large_pool, Converter_seed[Large_Pool_number])
UNITS: Dimensionless
: c AFR_LP.weight_of_AFR[Under_5_Years_Old] = TRIANGULAR(30, 50, 70, 81)
UNITS: Dimensionless
: c AFR_LP.weight_of_AFR[Over_5_Years_Old] = TRIANGULAR(100, 150, 200, 82)
UNITS: Dimensionless
UNITS: Dimensionless
: c AFR_LP.number_oocytes_per_unit_weight = UNIFORM(50, 10^6, 83)
UNITS: oocytes/day
: c AFR_LP.Oocyte_concetration_in_an_AFR[Age] = (weight_of_AFR[Age]*number_oocytes_per_unit_weight)
UNITS: oocytes/day
: c AFR_LP.Large_ARF_released[PHU, Large_Pool_number, Age] = IF (AFR_LP[PHU,Large_Pool_number,Age]=1) THEN Oocyte_concetration_in_an_AFR[Age] ELSE 0
UNITS: oocytes/day
: c AFR_LP.oocytes_released_into_LP[PHU, Large_Pool_number] = SUM(Large_ARF_released[PHU,Large_Pool_number, *])
UNITS: oocytes/day
: f Contamination_LP[PHU, Large_Pool_number] = IF PREVIOUS(Reactionary_hyperchlorination_LP[PHU,Large_Pool_number], 0) = 1 OR PREVIOUS(Routine_hyperchlorination_LP[PHU,Large_Pool_number], 0) = 1 THEN 0 ELSE (Oocytes_shed_intoLP[PHU,Large_Pool_number]+AFR_LP.oocytes_released_into_LP[PHU,Large_Pool_number]) {UNIFLOW}
UNITS: oocytes/day
: c Sick_swimmers.children_in_SP[PHU] = (infectious_child_swimmers[PHU]*(1-PAF_Messaging[Small_pool]))*(1-percent_of_children_using_LP)
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Metro_North, Under_5_Years_Old] = children_in_SP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Metro_North, Over_5_Years_Old] = Adults_in_SP[Metro_North]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Metro_South, Under_5_Years_Old] = children_in_SP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Metro_South, Over_5_Years_Old] = Adults_in_SP[Metro_South]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Gold_Coast, Under_5_Years_Old] = children_in_SP[Gold_Coast]
UNITS: persons/day
: c Sick_swimmers.Sick_People_in_SP[Gold_Coast, Over_5_Years_Old] = Adults_in_SP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
: c Users_in_each_SP[Small_pool_number] = IF Time_cycle <45 OR Time_cycle>300 THEN Seasonal_SP_users[Small_pool_number,Winter] ELSE Seasonal_SP_users[Small_pool_number,Summer]
UNITS: Dimensionless
: c Sick_swimmers_in_each_SP[PHU, Small_pool_number, Age] = Sick_swimmers.Sick_People_in_SP[PHU, Age]*Users_in_each_SP[Small_pool_number]
UNITS: persons/day
: c Percent_of_patrons_who_shower_SP[Age] = shower_sensitivity_variable
UNITS: Dimensionless
: c Oocyst_shed_by_SP_users[PHU, Small_pool_number, Age] = Sick_swimmers_in_each_SP*Oocytes_from_shedding_swimmers[PHU,Age] - ((Oocytes_from_shedding_swimmers[PHU,Age]*0.8)*(Sick_swimmers_in_each_SP*((Percent_of_patrons_who_shower_SP[Age]/100)+Sick_swimmers.PAF_Messaging[Small_pool])))
UNITS: oocytes/day
: c Sick_swimmers.Adults_in_SP[PHU] = (infectious_adult_swimmers[PHU]*(1-PAF_Messaging[Small_pool]))*(percent_of_adults_using_SP)
UNITS: persons/day
: c Oocytes_shed_into_SP[PHU, Small_pool_number] = SUM(Oocyst_shed_by_SP_users[PHU,Small_pool_number,*])
UNITS: oocytes/day
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_1] = BETA(1.44, 4.55, 101)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_2] = BETA(1.44, 4.55, 102)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_3] = BETA(1.44, 4.55, 103)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_4] = BETA(1.44, 4.55, 104)*0.045+0.005
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Under_5_Years_Old, SP_5] = BETA(1.44, 4.55, 105)*0.045+0.005

UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_1] = BETA(2.77, 3.22, 106)*0.09+0.001
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_2] = BETA(2.77, 3.22, 107)*0.09+0.001
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_3] = BETA(2.77, 3.22, 108)*0.09+0.001
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_4] = BETA(2.77, 3.22, 109)*0.09+0.001
UNITS: AFR/person
: c Probability_of_AFR_given_infection_SP[Over_5_Years_Old, SP_5] = BETA(2.77, 3.22, 110)*0.09+0.001
UNITS: AFR/person
UNITS: AFR/person
: c AFR_SP.AFR_per_day_in_small_pool[PHU, Small_pool_number, Age] = .Sick_swimmers_in_each_SP
*(.Probability_of_AFR_given_infection_SP[Age,Small_pool_number]
+(.Probability_of_AFR_given_infection_SP[Age,Small_pool_number]*(AFR_sensitivity_converter_SP[Age]/100)))
UNITS: AFR/day
: c AFR_SP.AFR_in_Small_Pool[PHU, Small_pool_number, Age] = BINOMIAL(1, AFR_per_day_in_small_pool,
Converter_SP_seed[Small_pool_number])
UNITS: Dimensionless
: c AFR_SP.weight_of_AFR[Under_5_Years_Old] = TRIANGULAR(30, 50, 70, 81)
UNITS: Dimensionless
: c AFR_SP.weight_of_AFR[Over_5_Years_Old] = TRIANGULAR(100, 150, 200, 82)
UNITS: Dimensionless
UNITS: Dimensionless
: c AFR_SP.number_oocytes_per_unit_weight = UNIFORM(50, 10^6, 83)
UNITS: oocytes/day
: c AFR_SP.Oocyte_concetration_in_an_AFR[Age] = (weight_of_AFR[Age]*number_oocytes_per_unit_weight)
UNITS: oocytes/day
: c AFR_SP.Small_ARF_released[PHU, Small_pool_number, Age] = IF
(AFR_in_Small_Pool[PHU,Small_pool_number,Age]=1) THEN Oocyte_concetration_in_an_AFR[Age] ELSE 0
UNITS: oocytes/day
: c AFR_SP.oocytes_released_into_SP[PHU, Small_pool_number] = SUM(Small_ARF_released[PHU, Small_pool_number, *])
UNITS: oocytes/day
: f Contamination_SP[PHU, Small_pool_number] = IF
PREVIOUS(Reactionary_hyperchlorination_SP[PHU,Small_pool_number], 0) = 1 OR
PREVIOUS(Routine_hyperchlorination_SP[PHU,Small_pool_number], 0) = 1 THEN 0 ELSE
Oocytes_shed_into_SP[PHU,Small_pool_number]+AFR_SP.oocytes_released_into_SP[PHU,Small_pool_number] {UNIFLOW}
UNITS: oocytes/day
: c Adult_secondary_transmission_rate[PHU] = 1/(UNIFORM(0, 0.05, 38))
UNITS: Dimensionless
: c AFR_detection_and_proper_management_rate_LP = AFR_detection_rate_sens_variable[Large_pool]
UNITS: Dimensionless
: c AFR_detected_LP[LP_1] = IF (RANDOM(0,100,10) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_2] = IF (RANDOM(0,100,11) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_3] = IF (RANDOM(0,100,12) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_4] = IF (RANDOM(0,100,13) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_5] = IF (RANDOM(0,100,14) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_6] = IF (RANDOM(0,100,15) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_7] = IF (RANDOM(0,100,16) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_8] = IF (RANDOM(0,100,17) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_9] = IF (RANDOM(0,100,18) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_LP[LP_10] = IF (RANDOM(0,100,19) < AFR_detection_and_proper_management_rate_LP) THEN 1 ELSE 0
UNITS: Dimensionless
UNITS: Dimensionless
: c AFR_detection_and_proper_management_rate_SP = AFR_detection_rate_sens_variable[Small_pool]
UNITS: Dimensionless
: c AFR_detected_SP[SP_1] = IF (RANDOM(0,100, 112) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0

UNITS: Dimensionless
: c AFR_detected_SP[SP_2] = IF (RANDOM(0,100, 112) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_SP[SP_3] = IF (RANDOM(0,100, 113) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_SP[SP_4] = IF (RANDOM(0,100, 114) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
: c AFR_detected_SP[SP_5] = IF (RANDOM(0,100, 115) < AFR_detection_and_proper_management_rate_SP) THEN 1 ELSE 0
UNITS: Dimensionless
UNITS: Dimensionless
: c Child_secondary_transmission_rate[PHU] = 1/(BETA(3.19,2.81, 1256)*0.31)
UNITS: Dimensionless
: c regional_population[Metro_North, Under_5_Years_Old] = GRAPH(TIME)
(564, 56725), (929, 57903), (1294, 58143), (1659, 59650), (2025, 60573), (2390, 60894)
UNITS: persons/day
: c regional_population[Metro_North, Over_5_Years_Old] = GRAPH(TIME)
(0, 798540), (800, 815400), (1600, 831058), (2400, 848276), (3200, 864512), (4000, 880862)
UNITS: persons/day
: c regional_population[Metro_South, Under_5_Years_Old] = GRAPH(TIME)
(564, 56725), (929, 57903), (1294, 58143), (1659, 59650), (2025, 60573), (2390, 60894)
UNITS: persons/day
: c regional_population[Metro_South, Over_5_Years_Old] = GRAPH(TIME)
(564, 930297), (929, 944542), (1294, 961834), (1659, 980630), (2025, 998045), (2390, 1013164)
UNITS: persons/day
: c regional_population[Gold_Coast, Under_5_Years_Old] = GRAPH(TIME)
(564, 32075), (929, 32707), (1294, 32529), (1659, 33357), (2025, 34088), (2390, 34445)
UNITS: persons/day
: c regional_population[Gold_Coast, Over_5_Years_Old] = GRAPH(TIME)
(564, 476952), (929, 486816), (1294, 496129), (1659, 507062), (2025, 516923), (2390, 525707)
UNITS: persons/day
UNITS: persons/day
: c daily_population_change[Metro_North, Under_5_Years_Old] = regional_population-(PREVIOUS(regional_population,
54908))
UNITS: persons/day
: c daily_population_change[Metro_North, Over_5_Years_Old] = regional_population-(PREVIOUS(regional_population,
798561))
UNITS: persons/day
: c daily_population_change[Metro_South, Under_5_Years_Old] = regional_population-(PREVIOUS(regional_population,
68453))
UNITS: persons/day
: c daily_population_change[Metro_South, Over_5_Years_Old] = regional_population-(PREVIOUS(regional_population,
908325))
UNITS: persons/day
: c daily_population_change[Gold_Coast, Under_5_Years_Old] = regional_population-(PREVIOUS(regional_population,
31100))
UNITS: persons/day
: c daily_population_change[Gold_Coast, Over_5_Years_Old] = regional_population-(PREVIOUS(regional_population,
461737))
UNITS: persons/day
UNITS: persons/day
: c Dose_response_parameter[PHU] = BETA(2.55,3.45,842)*0.061+0.005
UNITS: persons/oocytes/day
: c testing_senvar[Age] = 0.062+(0.062*(testing_mod[Age]/100))
UNITS: Dimensionless
: c fraction_of_people_tested[Age, PHU] = BETA(3.08, 2.91, 21)*0.2208+testing_senvar[Age]
UNITS: Dimensionless
: c fraction_of_tests_submitted = BETA(4, 2, 22)*0.04+0.91
UNITS: Dimensionless
: c HSF_senvar[Age] = 0.137+(0.137*(HSF_mod[Age]/100))
UNITS: Dimensionless
: c health_seeking_fraction[PHU, Age] = BETA(3.25, 2.75, 59)*0.103+HSF_senvar[Age]
UNITS: Dimensionless
: c Healthcare_Messaging_Converter[PHU] = IF Time_cycle = Healthcare_Messaging_start_date AND
Healthcare_messaging_switch = 1 THEN PULSE((Healthcare_Messaging_effectiveness/100),
Healthcare_Messaging_start_date) ELSE 0
UNITS: person/person/day

: c Healthcare_Messaging_effect[PHU, Age] =
DELAY1((Healthcare_Messaging_Converter[PHU]*Healthcare_Messaging_Effectiveness_Decay),
Healthcare_Messaging_Effectiveness_Decay)
UNITS: Dimensionless
: c high_risk_infection_rate = UNIFORM(0, 0.014, 119)
UNITS: Dimensionless
: c length_of_travel[PHU] = UNIFORM(2, 30, 36)
UNITS: Days
: c "Log-3_disinfection_SP"[PHU, Small_pool_number] = BETA(3.071,2.929, 20)*1.12+0.58
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_1] = UNIFORM(2,10, 20)
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_2] = UNIFORM(2,10, 20)
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_3] = UNIFORM(2,10, 20)
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_4] = BETA(3.071,2.929, 20)*1.12+0.58
UNITS: Days
: c "Log-3_disinfection_SP_highest_risk_only"[SP_5] = BETA(3.071,2.929, 20)*1.12+0.58
UNITS: Days
UNITS: Days
: c low_risk_infection_rate = UNIFORM(0, 0.009,347)
UNITS: Dimensionless
: c Routine_Messaging_Converter[PHU] = IF (Time_cycle = Routine_Messaging_start_date AND PH_Public_messaging_switch
= 1) THEN PULSE((Routine_Messaging_effectiveness/100), Routine_Messaging_start_date) ELSE 0
UNITS: person/person/day
: c Messaging_behaviour_change_proportion[PHU, Age] = DELAY1(Routine_Messaging_Converter[PHU],
Routine_Messaging_Effectiveness_Decay)
UNITS: person/person/day
: c microscopy_sensitivity[PHU] = BETA(3.25, 2.74, 20)*0.67+0.33
UNITS: Dimensionless
: c oocyte_inactivation_SP[PHU, Small_pool_number] = UNIFORM(2,10, 20)
UNITS: days
: c PCR_sensitivity[PHU] = BETA(3.72, 2.23, 26)*0.139+0.8
UNITS: Dimensionless
: c Percent_of_oocytes_viable = BETA(3.06, 2.95, 602)*38.9+61.1
UNITS: Dimensionless
: c Pool_waster_ingested_per_swim[Under_5_Years_Old, Large_pool] = BETA(2.26,4.66, 42)*0.154
UNITS: Litre/person
: c Pool_waster_ingested_per_swim[Under_5_Years_Old, Small_pool] = BETA(2.26,4.66, 43)*0.154
UNITS: Litre/person
: c Pool_waster_ingested_per_swim[Over_5_Years_Old, Large_pool] = BETA(2.71,4.66, 40)*0.053
UNITS: Litre/person
: c Pool_waster_ingested_per_swim[Over_5_Years_Old, Small_pool] = UNIFORM(0, 0.01, 41)
UNITS: Litre/person
UNITS: Litre/person
: c Probably_of_being_symptomatic_given_infection = BETA(2.16, 3.84, 3)*0.38+0.5
UNITS: Dimensionless
: c Rate_of_symptomatic_travellers = BETA(2.16, 3.84, 141)*0.38+0.5
UNITS: Per Day
: c Relapse_Rate = BETA(1.84, 4.06, 8)*0.62+0.18
UNITS: Dimensionless
: c awareness_delay[Under_5_Years_Old] = BETA(1.66, 4.33, 27)*(7-1)+1
UNITS: days
: c awareness_delay[Over_5_Years_Old] = BETA(1.89, 4.11, 28)*(10-9)+1
UNITS: days
UNITS: days
: c duration_of_symptoms = BETA(2.04,3.31, 4)*27+1
UNITS: days
: c faecal_testing_delay = UNIFORM(1, 5, 25)
UNITS: days
: c Incubation_Period = BETA(4.3, 3.6, 99)*11+1
UNITS: days
: c "Log-3_disinfection_LP"[PHU, Large_Pool_number] = BETA(2.47,3.53, 44)*1.465+1.16
UNITS: days
: c notification_delay = LOGNORMAL(6.29, 4.65, 33)

UNITS: days
: c oocyte_inactivation_LP[PHU, Large_Pool_number] = UNIFORM(2,10, 44)
UNITS: days
: c "Post-symptom_infectious_period" = BETA(2.69,3.31, 9)*13+1
UNITS: days
: c Reinfection_delay = BETA(1.5,4.5, 5)*8+2
UNITS: days
: c relapse_duration = BETA(1.28, 4.71, 7)*14+1
UNITS: Days
: c treatment_seeking_delay = BETA(1.3, 4.69, 23)*26+1
UNITS: Days
: f Daily_population_change_rate[PHU, Age] = daily_population_change[PHU, Age]
UNITS: persons/day
: c predicted_people_with_crypto_tested[Age, PHU] =
(PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age,PHU]*fraction_of_people_tested[Age,PHU])*(fraction_of_tests_submitted)
UNITS: Persons
: c testing_gap[Age, PHU] = predicted_people_with_crypto_tested[Age,PHU]-PEOPLE_WITH_CRYPTO_TESTED[Age,PHU]
UNITS: persons
: f faecal_testing_rate[Age, PHU] = testing_gap[Age,PHU]/faecal_testing_delay
UNITS: person/day
: c predicted_people_with_crypto_going_to_doctor[Age, PHU] =
SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU,Age]*health_seeking_fraction[PHU,Age]
UNITS: persons
: c healthcare_seeking_gap[Age, PHU] = predicted_people_with_crypto_going_to_doctor[Age,PHU]-
PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age,PHU]
UNITS: persons
: f healthcare_seeking_rate[Age, PHU] = healthcare_seeking_gap[Age,PHU]/treatment_seeking_delay
UNITS: person/day
: c testing_transition = GRAPH(TIME)
(1, 0.000), (2009, 0.000), (2010, 0.050), (2206, 0.100), (2393, 0.150), (2571, 0.200), (2755, 0.300), (2936, 0.500), (3102, 0.700), (3486, 0.800), (4000, 0.850)
UNITS: Dimensionless
: c positive_crypto_cases[Age, PHU] =
((PEOPLE_WITH_CRYPTO_TESTED[Age,PHU]*testing_transition)*PCR_sensitivity[PHU])+((PEOPLE_WITH_CRYPTO_TESTED[Age,PHU]*(1-testing_transition)*microscopy_sensitivity[PHU]))
UNITS: persons
: c Notification_Gap[PHU, Age] = positive_crypto_cases[Age, PHU]-NOTIFIED_CRYPTO_CASES[PHU,Age]
UNITS: persons
: f notifying[PHU, Age] = Notification_Gap[PHU,Age]/notification_delay
UNITS: person/day
: f Asymptomatic_infection[PHU, Age] = (LATENTLY_INFECTED_PEOPLE[PHU, Age]*(1-
Probably_of_being_symptomatic_given_infection))/Incubation_Period {UNIFLOW}
UNITS: persons/day
: f asymptomatic_returning[PHU, Age] = EXPOSED_TRAVELLERS[PHU, Age]*(1-Rate_of_symptomatic_travellers)
{UNIFLOW}
UNITS: persons/day
: f Asymptopatic_recovery[PHU, Age] = ASYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age]/"Post-
symptom_infectious_period" {UNIFLOW}
UNITS: persons/day
: c fraction_of_positive_cases_made_aware[Age] = Fraction_made_aware_sens_variable
UNITS: Dimensionless
: c predicted_aware_infectious_people[Age, PHU] =
positive_crypto_cases[Age,PHU]*((fraction_of_positive_cases_made_aware[Age]/100)+Healthcare_Messaging_effect[PHU,Age])
UNITS: persons
: f Aware_diagnosed_cases[Age, PHU] = (predicted_aware_infectious_people[Age,PHU]/awareness_delay[Age]) {UNIFLOW}
UNITS: person/day
: f symptomatic_returning[PHU, Age] = (EXPOSED_TRAVELLERS[PHU, Age]*Rate_of_symptomatic_travellers)
{UNIFLOW}
UNITS: persons/day
: c Percent_of_sympotmatic_travellers_screened_out = 0+Traveller_screening_sens_variable
UNITS: Dimensionless
: f Aware_imported_cases[Age, PHU] =
symptomatic_returning[PHU,Age]*(Percent_of_sympotmatic_travellers_screened_out/100) {UNIFLOW}
UNITS: person/day

: c physician_precautionary_advice_fraction[Age] = Physician_precautionary_advice_sense_variable
UNITS: Dimensionless
: c people_not_tested_but_aware[Age, PHU] = (PEOPLE_WITH_CRYPTO_AT_THE_DOCTOR[Age,PHU]*(1-(fraction_of_people_tested*fraction_of_tests_submitted)))*((physician_precautionary_advice_fraction[Age]/100)+(Healthcare_Messaging_effect[PHU,Age]))
UNITS: persons
: f Aware_suspected_cases[Age, PHU] = people_not_tested_but_aware/informal_awareness_delay {UNIFLOW}
UNITS: person/day
: c total_symptomatic_people[PHU, Age] = RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE + RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE + SYMPTOMATIC_INFECTIOUS_PEOPLE
UNITS: persons
: f aware_unconsulted_cases[Age, PHU] = ((total_symptomatic_people[PHU,Age]-AWARE_INFECTIOUS_PEOPLE[Age,PHU])*Messaging_behaviour_change_proportion[PHU,Age]) {UNIFLOW}
UNITS: person/day
: c Disinfectant_type_switch_LP = 0+"3-log_disinfection_sens_variable"[Large_pool]
UNITS: Dimensionless
: f Removal_LP[PHU, Large_Pool_number] = IF Disinfectant_type_switch_LP = 1 THEN (Oocytes_in_the_large_pool[PHU,Large_Pool_number]/"Log-3_disinfection_LP") ELSE (Oocytes_in_the_large_pool[PHU,Large_Pool_number]/oocyte_inactivation_LP[PHU,Large_Pool_number]) {UNIFLOW}
UNITS: oocytes/day
: c Reactionary_hyperchlorination_LP[PHU, Large_Pool_number] = IF AFR_LP.oocytes_released_into_LP[PHU, Large_Pool_number] >0 AND AFR_detected_LP[Large_Pool_number]>0 THEN 1 ELSE 0
UNITS: Dimensionless
: c Routine_hyperchlorination_switch_LP = 0+routine_hyperchloronation_switch_sens_variable
UNITS: Dimensionless
: c Routine_hyperchlorination_frequency_LP = 0+routine_hyperchloronation_frequency_sens_variable
UNITS: Dimensionless
: c Routine_hyperchlorination_LP[PHU, Large_Pool_number] = (PULSE (Routine_hyperchlorination_switch_LP, Routine_hyperchlorination_frequency_LP, Routine_hyperchlorination_frequency_LP))*DT
UNITS: Dimensionless
: f Decontamination_LP[PHU, Large_Pool_number] = IF Reactionary_hyperchlorination_LP[PHU,Large_Pool_number] = 1 THEN ((Oocytes_in_the_large_pool[PHU,Large_Pool_number]/DT)+(Contamination_LP-Removal_LP[PHU,Large_Pool_number])) ELSE IF Routine_hyperchlorination_LP[PHU,Large_Pool_number]= 1 THEN ((Oocytes_in_the_large_pool[PHU,Large_Pool_number]/DT)+(Contamination_LP-Removal_LP[PHU,Large_Pool_number])) ELSE 0 {UNIFLOW}
UNITS: oocytes/day
: c Disinfectant_type_switch_SP = 0+"3-log_disinfection_sens_variable"[Small_pool]
UNITS: Dimensionless
: f Removal_SP[PHU, Small_pool_number] = IF Disinfectant_type_switch_SP= 1 THEN (Oocytes_in_the_small_pool[PHU,Small_pool_number]/"Log-3_disinfection_SP") ELSE IF Disinfectant_type_switch_SP = 2 THEN (Oocytes_in_the_small_pool[PHU,Small_pool_number]/"Log-3_disinfection_SP_highest_risk_only"[Small_pool_number]) ELSE (Oocytes_in_the_small_pool[PHU,Small_pool_number]/oocyte_inactivation_SP[PHU,Small_pool_number]) {UNIFLOW}
UNITS: oocytes/day
: c Reactionary_hyperchlorination_SP[PHU, Small_pool_number] = IF (AFR_SP.oocytes_released_into_SP[PHU,Small_pool_number]>0 AND AFR_detected_SP[Small_pool_number]>0) THEN 1 ELSE 0
UNITS: Dimensionless
: c Routine_hyperchlorination_switch_SP = 0+routine_hyperchloronation_switch_sens_variable
UNITS: Dimensionless
: c Routine_hyperchlorination_frequency_SP = 0+routine_hyperchloronation_frequency_sens_variable
UNITS: Dimensionless
: c Routine_hyperchlorination_SP[PHU, Small_pool_number] = (PULSE (Routine_hyperchlorination_switch_SP , Routine_hyperchlorination_frequency_SP, Routine_hyperchlorination_frequency_SP))*DT
UNITS: Dimensionless
: f Decontamination_SP[PHU, Small_pool_number] = IF Reactionary_hyperchlorination_SP[PHU,Small_pool_number] = 1 THEN ((Oocytes_in_the_small_pool[PHU,Small_pool_number]/DT)+(Contamination_SP-Removal_SP[PHU,Small_pool_number])) ELSE IF Routine_hyperchlorination_SP[PHU,Small_pool_number] = 1 THEN ((Oocytes_in_the_small_pool[PHU,Small_pool_number]/DT)+(Contamination_SP-Removal_SP[PHU,Small_pool_number])) ELSE 0 {UNIFLOW}
UNITS: oocytes/day
: c Daily_departures[Under_5_Years_Old] = GRAPH(TIME)
(1, 232.0), (14, 232.0), (45, 86.0), (76, 82.0), (106, 91.0), (137, 165.0), (167, 82.0), (198, 86.0), (229, 87.0), (258, 104.0), (289, 78.0), (319, 97.0), (350, 99.0), (380, 129.0), (411, 102.0), (442, 65.0), (472, 84.0), (503, 137.0), (533, 82.0), (564, 47.0), (595, 95.0), (623, 145.0), (654, 106.0), (684, 107.0), (715, 91.0), (745, 136.0), (776, 116.0), (807, 112.0), (837, 94.0), (868, 177.0), (898, 91.0), (929, 79.0), (960, 119.0), (988, 94.0), (1019, 120.0), (1049, 134.0), (1080, 107.0), (1110, 134.0), (1141, 142.0), (1172,

99.0), (1202, 114.0), (1233, 215.0), (1263, 109.0), (1294, 94.0), (1325, 96.0), (1353, 117.0), (1384, 129.0), (1414, 140.0), (1445, 96.0), (1475, 123.0), (1506, 121.0), (1537, 94.0), (1567, 116.0), (1598, 231.0), (1628, 124.0), (1659, 106.0), (1690, 137.0), (1719, 139.0), (1750, 130.0), (1780, 152.0), (1811, 119.0), (1841, 120.0), (1872, 167.0), (1903, 152.0), (1933, 141.0), (1964, 196.0), (1994, 83.0), (2025, 119.0), (2056, 167.0), (2084, 142.0), (2115, 159.0), (2145, 162.0), (2176, 100.0), (2206, 195.0), (2237, 152.0), (2268, 142.0), (2298, 134.0), (2329, 217.0), (2359, 146.0), (2390, 103.0), (2421, 134.0), (2449, 155.0), (2480, 136.0), (2510, 158.0), (2541, 128.0), (2571, 164.0), (2602, 152.0), (2633, 150.0), (2663, 168.0), (2694, 221.0), (2724, 122.0), (2755, 110.0), (2786, 132.0), (2814, 176.0), (2845, 147.0), (2875, 163.0), (2906, 106.0), (2936, 184.0), (2967, 168.0), (2998, 169.0), (3028, 160.0), (3059, 303.0), (3089, 151.0), (3120, 110.0), (3151, 198.0), (3180, 132.0), (3211, 128.0), (3241, 196.0), (3272, 148.0), (3302, 167.0), (3333, 201.0), (3364, 172.0), (3394, 142.0), (3425, 330.0), (3455, 193.0), (3486, 113.0), (3517, 168.0), (3545, 207.0), (3576, 165.0), (3606, 214.0), (3637, 129.0)
UNITS: persons/day
: c Daily_departures[Over_5_Years_Old] = GRAPH(TIME)
(1, 6251), (14, 6251), (45, 3289), (76, 2354), (106, 2637), (137, 3872), (167, 2472), (198, 2257), (229, 2707), (258, 2810), (289, 2780), (319, 3252), (350, 2571), (380, 2927), (411, 3412), (442, 2691), (472, 2725), (503, 3992), (533, 2307), (564, 2393), (595, 2699), (623, 3129), (654, 2898), (684, 3323), (715, 2722), (745, 3309), (776, 3851), (807, 2752), (837, 3168), (868, 4531), (898, 2819), (929, 2501), (960, 3025), (988, 3399), (1019, 2999), (1049, 3860), (1080, 3027), (1110, 3341), (1141, 4160), (1172, 3053), (1202, 3443), (1233, 4884), (1263, 3028), (1294, 2693), (1325, 3012), (1353, 4137), (1384, 3347), (1414, 4138), (1445, 3203), (1475, 3785), (1506, 4519), (1537, 3397), (1567, 3742), (1598, 5254), (1628, 3152), (1659, 3095), (1690, 3775), (1719, 3688), (1750, 3523), (1780, 4443), (1811, 3229), (1841, 3831), (1872, 4554), (1903, 3525), (1933, 3753), (1964, 5280), (1994, 3211), (2025, 3022), (2056, 4067), (2084, 4243), (2115, 3908), (2145, 4888), (2176, 3498), (2206, 3994), (2237, 4981), (2268, 3860), (2298, 4086), (2329, 5743), (2359, 3688), (2390, 3661), (2421, 3684), (2449, 4972), (2480, 3880), (2510, 4617), (2541, 3870), (2571, 4330), (2602, 4960), (2633, 3901), (2663, 4246), (2694, 6101), (2724, 4045), (2755, 3377), (2786, 4006), (2814, 4666), (2845, 4085), (2875, 4912), (2906, 4151), (2936, 5318), (2967, 5333), (2998, 4713), (3028, 4216), (3059, 6369), (3089, 4225), (3120, 3736), (3151, 4945), (3180, 4375), (3211, 3998), (3241, 5511), (3272, 4247), (3302, 4664), (3333, 5566), (3364, 4485), (3394, 4592), (3425, 6690), (3455, 4231), (3486, 3824), (3517, 4656), (3545, 5345), (3576, 4703), (3606, 5524), (3637, 3896)
UNITS: persons/day
UNITS: persons/day
: f departing[PHU, Age] = (Daily_departures[Age]*SEQ_fraction[PHU, Age]) {UNIFLOW}
UNITS: persons/day
: c oocytes_per_Litre_in_SPs[PHU, Small_pool_number] =
Oocytes_in_the_small_pool[PHU,Small_pool_number]/SP_volume[Small_pool_number]
UNITS: oocytes/Litre
: c Crypto_dose_in_SPs[PHU, Age, Small_pool_number] =
(oocytes_per_Litre_in_SPs[PHU,Small_pool_number]*(Percent_of_oocytes_viable/100))*Pool_waster_ingested_per_swim[Age, Small_pool]
UNITS: oocytes/person
: c Probability_of_infection_per_swim_event_SP[PHU, Small_pool_number, Age] = 1-EXP(-Crypto_dose_in_SPs[PHU, Age,Small_pool_number]*Dose_response_parameter[PHU])
UNITS: Dimensionless
: c Healthy_Swimmers.Susceptible_swimmers[PHU, Age] = .SUSCEPTIBLE_PEOPLE[PHU, Age]*.Portion_of_population_who_swim[Age]
UNITS: persons
: c Healthy_Swimmers.Daily_susceptible_Swimmers[PHU, Age] = .Daily_Swimming_frequency*(Susceptible_swimmers[PHU, Age]*.Seasonal_converter[Age])
UNITS: persons/day
: c Healthy_Swimmers.susceptible_child_swimmers[PHU] = Daily_susceptible_Swimmers[PHU,Under_5_Years_Old]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_children_in_SP[PHU] = susceptible_child_swimmers[PHU]*(1-percent_of_children_using_LP)
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_North, Under_5_Years_Old] = Healthy_children_in_SP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_North, Over_5_Years_Old] = Healthy_adults_in_SP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_South, Under_5_Years_Old] = Healthy_children_in_SP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Metro_South, Over_5_Years_Old] = Healthy_adults_in_SP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Gold_Coast, Under_5_Years_Old] = Healthy_children_in_SP[Gold_Coast]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_SP[Gold_Coast, Over_5_Years_Old] = Healthy_adults_in_SP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
: c healthy_swimmers_in_each_SP[PHU, Small_pool_number, Age] = Healthy_Swimmers.Healthy_People_in_SP[PHU, Age]*Users_in_each_SP[Small_pool_number]
UNITS: persons/day

: c New_cases_from_SPs[PHU, Small_pool_number, Age] = Probability_of_infection_per_swim_event_SP[PHU, Small_pool_number, Age]*healthy_swimmers_in_each_SP[PHU, Small_pool_number, Age]
UNITS: persons/day
: c Healthy_Swimmers.susceptible_adult_swimmers[PHU] = Daily_susceptible_Swimmers[PHU,Over_5_Years_Old]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_adults_in_SP[PHU] = susceptible_adult_swimmers[PHU]*(percent_of_adults_using_SP)
UNITS: persons/day
: c oocytes_per_Litre_in_LPs[PHU, Large_Pool_number] = Oocytes_in_the_large_pool[PHU,Large_Pool_number]/LP_volume[Large_Pool_number]
UNITS: oocytes/Litre
: c Crypto_dose_in_LPs[PHU, Age, Large_Pool_number] = (oocytes_per_Litre_in_LPs[PHU,Large_Pool_number]*(Percent_of_oocytes_viable/100))*Pool_waster_ingested_per_swim[Age, Large_pool]
UNITS: oocytes/person
: c Probability_of_infection_per_swim_event_LP[PHU, Large_Pool_number, Age] = 1-EXP(-Crypto_dose_in_LPs[PHU,Age,Large_Pool_number]*Dose_response_parameter[PHU])
UNITS: Dimensionless
: c Healthy_Swimmers.healthy_children_in_LP[PHU] = susceptible_child_swimmers[PHU]*percent_of_children_using_LP
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_North, Under_5_Years_Old] = healthy_children_in_LP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_North, Over_5_Years_Old] = healthy_adults_in_LP[Metro_North]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_South, Under_5_Years_Old] = healthy_children_in_LP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Metro_South, Over_5_Years_Old] = healthy_adults_in_LP[Metro_South]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Gold_Coast, Under_5_Years_Old] = healthy_children_in_LP[Gold_Coast]
UNITS: persons/day
: c Healthy_Swimmers.Healthy_People_in_LP[Gold_Coast, Over_5_Years_Old] = healthy_adults_in_LP[Gold_Coast]
UNITS: persons/day
UNITS: persons/day
: c healthy_swimmers_in_each_LP[PHU, Large_Pool_number, Age] = Healthy_Swimmers.Healthy_People_in_LP[PHU, Age]*Users_in_each_LP[Large_Pool_number]
UNITS: persons/day
: c New_cases_from_LP[PHU, Large_Pool_number, Age] = Probability_of_infection_per_swim_event_LP[PHU, Large_Pool_number, Age]*healthy_swimmers_in_each_LP[PHU, Large_Pool_number, Age]
UNITS: persons/day
: c Healthy_Swimmers.healthy_adults_in_LP[PHU] = susceptible_adult_swimmers[PHU]*(1-percent_of_adults_using_SP)
UNITS: persons/day
: c New_swimming_related_cases[PHU, Age] = (SUM(New_cases_from_SPs[PHU, *, Age])+SUM(New_cases_from_LP[PHU, *, Age]))+((SUM(New_cases_from_SPs[PHU, *, Age])+SUM(New_cases_from_LP[PHU, *, Age]))*(Swimming_cases_sensitivity_parameter/100))
UNITS: persons/day
: f Avoided_cases[Age, PHU] = LEAKAGE OUTFLOW
LEAKAGE FRACTION = Proportion_of_cases_avoided[Age,PHU]
UNITS: persons/day
: f Secondary_transmission[Age, PHU] = CONVEYOR OUTFLOW
UNITS: persons/day
: c New_person_to_person_cases[Age, PHU] = Secondary_transmission[Age,PHU]
UNITS: persons/day
: f Exposure[PHU, Age] = New_swimming_related_cases[PHU, Age]+New_person_to_person_cases[Age,PHU] {UNIFLOW}
INIT : f Exposure[PHU, Age] = 1
UNITS: persons/day
VALUE: 0.133333, 0.133333
VALUE: 0.133333, 0.133333
VALUE: 0.133333, 0.133333
UNITS: persons/day
: c proportion_of_low_risk_travellers[Under_5_Years_Old] = GRAPH(TIME)
(1, 0.634097035), (14, 0.634097035), (45, 0.593344614), (76, 0.581357318), (106, 0.615167406), (137, 0.517241379), (167, 0.574064838), (198, 0.692818346), (229, 0.505494505), (258, 0.51372273), (289, 0.580760095), (319, 0.458670989), (350, 0.696394687), (380, 0.683827101), (411, 0.502708559), (442, 0.621501014), (472, 0.580186916), (503, 0.516717325), (533, 0.529243937), (564, 0.672519754), (595, 0.644219541), (623, 0.510419907), (654, 0.489570552), (684, 0.617998741), (715, 0.577261307), (745, 0.791694575), (776, 0.590179123), (807, 0.594421848), (837, 0.632902299), (868, 0.534036433), (898, 0.591334895), (929, 0.664342629), (960, 0.550252231), (988, 0.548459384), (1019, 0.602933038), (1049, 0.624422188), (1080, 0.552631579), (1110, 0.657649254), (1141, 0.608765195), (1172, 0.584959816), (1202, 0.539413681), (1233, 0.575418994),

(1263, 0.472459802), (1294, 0.634690463), (1325, 0.51826793), (1353, 0.521586185), (1384, 0.438830542), (1414, 0.525792092), (1445, 0.506736965), (1475, 0.621994657), (1506, 0.585753425), (1537, 0.469601677), (1567, 0.493604651), (1598, 0.545742574), (1628, 0.472294148), (1659, 0.540921551), (1690, 0.577429984), (1719, 0.474642005), (1750, 0.580612503), (1780, 0.449649369), (1811, 0.623839009), (1841, 0.596926128), (1872, 0.538629539), (1903, 0.562533693), (1933, 0.622200584), (1964, 0.513765025), (1994, 0.537059538), (2025, 0.599943012), (2056, 0.544797688), (2084, 0.62283737), (2115, 0.495047276), (2145, 0.574400843), (2176, 0.596332863), (2206, 0.56010704), (2237, 0.597411602), (2268, 0.525214082), (2298, 0.510332435), (2329, 0.57745418), (2359, 0.55918619), (2390, 0.59597653), (2421, 0.474413345), (2449, 0.474474474), (2480, 0.531325566), (2510, 0.491981026), (2541, 0.54992729), (2571, 0.658690745), (2602, 0.593515139), (2633, 0.565553283), (2663, 0.554711838), (2694, 0.55815832), (2724, 0.557725948), (2755, 0.566144913), (2786, 0.558804627), (2814, 0.526441036), (2845, 0.479900539), (2875, 0.434977578), (2906, 0.555675969), (2936, 0.689534204), (2967, 0.625443911), (2998, 0.577828054), (3028, 0.515763766), (3059, 0.497238896), (3089, 0.58301682), (3120, 0.528682006), (3151, 0.464605735), (3180, 0.420938104), (3211, 0.475082412), (3241, 0.530063664), (3272, 0.551883522), (3302, 0.698446031), (3333, 0.675910596), (3364, 0.618271418), (3394, 0.609454422), (3425, 0.450927734), (3455, 0.488162119), (3486, 0.57710235), (3517, 0.404519774), (3545, 0.520938023), (3576, 0.509970522), (3606, 0.505882353), (3637, 0.474032337), (3666, 0.547489186), (3696, 0.715458276), (3726, 0.543772486), (3756, 0.546594595)

UNITS: Dimensionless

: c proportion_of_low_risk_travellers[Over_5_Years_Old] = GRAPH(TIME)
(1, 0.630387228), (14, 0.630387228), (45, 0.618068756), (76, 0.612660624), (106, 0.634493578), (137, 0.548783362), (167, 0.529), (198, 0.60872697), (229, 0.571640405), (258, 0.563502734), (289, 0.539120804), (319, 0.526006826), (350, 0.602397822), (380, 0.616829333), (411, 0.594252107), (442, 0.595940771), (472, 0.591048313), (503, 0.530630619), (533, 0.525705575), (564, 0.59744488), (595, 0.554474137), (623, 0.561242727), (654, 0.529321357), (684, 0.550834696), (715, 0.591572656), (745, 0.613979396), (776, 0.608109354), (807, 0.5896454), (837, 0.58567578), (868, 0.524396684), (898, 0.510263821), (929, 0.584511198), (960, 0.558141945), (988, 0.540753725), (1019, 0.514606178), (1049, 0.540456838), (1080, 0.578234185), (1110, 0.613878654), (1141, 0.606790823), (1172, 0.592592593), (1202, 0.572571466), (1233, 0.508189669), (1263, 0.491782794), (1294, 0.581055535), (1325, 0.530686555), (1353, 0.501949651), (1384, 0.501091909), (1414, 0.525521593), (1445, 0.5535722), (1475, 0.582636711), (1506, 0.590396555), (1537, 0.577097105), (1567, 0.555150991), (1598, 0.493439914), (1628, 0.505968453), (1659, 0.581463085), (1690, 0.519711586), (1719, 0.497767335), (1750, 0.508431484), (1780, 0.515428021), (1811, 0.568176494), (1841, 0.586229034), (1872, 0.580115202), (1903, 0.568378638), (1933, 0.566297604), (1964, 0.506305441), (1994, 0.499380309), (2025, 0.573171529), (2056, 0.512672212), (2084, 0.513739026), (2115, 0.526055669), (2145, 0.523317727), (2176, 0.564463845), (2206, 0.60085915), (2237, 0.590666632), (2268, 0.568140727), (2298, 0.563183952), (2329, 0.501239851), (2359, 0.519519376), (2390, 0.572089142), (2421, 0.511709104), (2449, 0.497632272), (2480, 0.49726519), (2510, 0.525847114), (2541, 0.562747945), (2571, 0.603078744), (2602, 0.58204255), (2633, 0.583109573), (2663, 0.564740082), (2694, 0.507620706), (2724, 0.513254821), (2755, 0.584424144), (2786, 0.550255037), (2814, 0.512927425), (2845, 0.520247415), (2875, 0.521157428), (2906, 0.581695553), (2936, 0.632827271), (2967, 0.610704301), (2998, 0.606447196), (3028, 0.584721271), (3059, 0.543577346), (3089, 0.508930338), (3120, 0.601849386), (3151, 0.547837675), (3180, 0.526698553), (3211, 0.549749357), (3241, 0.534747587), (3272, 0.567245977), (3302, 0.629951919), (3333, 0.600823991), (3364, 0.576264311), (3394, 0.583254229), (3425, 0.529441447), (3455, 0.526925099), (3486, 0.596330918), (3517, 0.550062875), (3545, 0.532593643), (3576, 0.537549246), (3606, 0.52578497), (3637, 0.583457634), (3666, 0.628317512), (3696, 0.59929787), (3726, 0.596800243), (3756, 0.580081508)

UNITS: Dimensionless

UNITS: Dimensionless

: f "high-risk_exposure"[PHU, Age] = ((TRAVELLERS[PHU, Age]*(1-proportion_of_low_risk_travellers[Age])*(high_risk_infection_rate))+(TRAVELLERS[PHU, Age]*proportion_of_low_risk_travellers[Age]*(low_risk_infection_rate)))/length_of_travel[PHU] {UNIFLOW}

UNITS: persons/day

: f Symptomatic_infection[PHU, Age] = (LATENTLY_INFECTED_PEOPLE[PHU, Age]*Probably_of_being_symptomatic_given_infection)/Incubation_Period {UNIFLOW}

UNITS: persons/day

: c Total_new_infections[PHU, Age] = SUM(Asymptomatic_infection[*,*]) + SUM(Symptomatic_infection[*,*]) + asymptomatic_returning + symptomatic_returning

UNITS: persons/day

: c Potential_infectors[Age, PHU] = Total_new_infections[PHU,Age]

UNITS: persons/day

: c New_secondary_cases[Under_5_Years_Old, Metro_North] = ((Potential_infectors[Under_5_Years_Old,Metro_North]/Child_secondary_transmission_rate[Metro_North])*0.25)+((Potential_infectors[Over_5_Years_Old, Metro_North]/Adult_secondary_transmission_rate[Metro_North])*0.5)

UNITS: persons/day

: c New_secondary_cases[Under_5_Years_Old, Metro_South] = ((Potential_infectors[Under_5_Years_Old,Metro_South]/Child_secondary_transmission_rate[Metro_South])*0.25)+((Potential_infectors[Over_5_Years_Old, Metro_South]/Adult_secondary_transmission_rate[Metro_South])*0.5)

UNITS: persons/day

: c New_secondary_cases[Under_5_Years_Old, Gold_Coast] = ((Potential_infectors[Under_5_Years_Old,Gold_Coast]/Child_secondary_transmission_rate[Gold_Coast])*0.25)+((Potential_infectors[Over_5_Years_Old, Gold_Coast]/Adult_secondary_transmission_rate[Gold_Coast])*0.5)

UNITS: persons/day

: c New_secondary_cases[Over_5_Years_Old, Metro_North] =
((Potential_infectors[Under_5_Years_Old,Metro_North]/Child_secondary_transmission_rate[Metro_North])*0.75)+((Potential_infectors[Over_5_Years_Old,Metro_North]/Adult_secondary_transmission_rate[Metro_North])*0.5)
UNITS: persons/day
: c New_secondary_cases[Over_5_Years_Old, Metro_South] =
((Potential_infectors[Under_5_Years_Old,Metro_South]/Child_secondary_transmission_rate[Metro_South])*0.75)+((Potential_infectors[Over_5_Years_Old,Metro_South]/Adult_secondary_transmission_rate[Metro_South])*0.5)
UNITS: persons/day
: c New_secondary_cases[Over_5_Years_Old, Gold_Coast] =
((Potential_infectors[Under_5_Years_Old,Gold_Coast]/Child_secondary_transmission_rate[Gold_Coast])*0.75)+((Potential_infectors[Over_5_Years_Old,Gold_Coast]/Adult_secondary_transmission_rate[Gold_Coast])*0.5)
UNITS: persons/day
UNITS: persons/day
: f "pre-infection_contacts"[Age, PHU] = New_secondary_cases[Age,PHU]*SA_sensitivity {UNIFLOW}
UNITS: persons/day
: f Recovery_rate[Age, PHU] = AWARE_INFECTIOUS_PEOPLE[Age,PHU]/(duration_of_symptoms+"Post-symptom_infectious_period") {UNIFLOW}
UNITS: person/day
: f Relapse_recovery[PHU, Age] = RELAPSED_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]/relapse_duration {UNIFLOW}
UNITS: persons/day
: f Relapsing[PHU, Age] = RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]*Relapse_Rate/Reinfection_delay {UNIFLOW}
UNITS: persons/day
: f returning_uninfected[PHU, Age] = ((TRAVELLERS[PHU, Age]*proportion_of_low_risk_travellers[Age]*(1-low_risk_infection_rate))+((TRAVELLERS[PHU, Age]*(1-proportion_of_low_risk_travellers[Age])*(1-high_risk_infection_rate))))/length_of_travel[PHU] {UNIFLOW}
UNITS: persons/day
: f symptomatic_recovery[PHU, Age] = (RECOVERING_SYMPTIMATIC_INFECTIOUS_PEOPLE[PHU, Age]*(1-Relapse_Rate)/"Post-symptom_infectious_period") {UNIFLOW}
UNITS: persons/day
: f symptoms_waning[PHU, Age] = SYMPTOMATIC_INFECTIOUS_PEOPLE[PHU, Age]/duration_of_symptoms {UNIFLOW}
UNITS: persons/day
: f Waning_immunity[PHU, Age] = RECOVERED_PEOPLE[PHU, Age]/length_of_immunity {UNIFLOW}
UNITS: persons/day
: c total_infectious_people_per_PHU[PHU] = SUM(Total_Infectious_People[PHU,*])
UNITS: persons
: c Grand_total_infectious_people = SUM(total_infectious_people_per_PHU)
UNITS: persons