**Equations for Prophylaxis Model (3 Strain)**

|  |  |
| --- | --- |
| **Parameter** | **Description** |
| β | Transmission rate |
| λ | Birth/death rate |
| μx | Natural recovery rate |
| η | Scaling factor reducing the rate of natural recovery for those who are colonised |
| ρ | Probability that prophylaxis that results in success |
| τ | Rate of treatment-mediated recovery |
| φ | Probability that transmission results in infection rather than colonisation |
| θ | Rate of loss of protection from prophylaxis |
| κ | Rate of reversion from resistant colonised to WT colonisation |
| Pr | Rate of prophylaxis |
| fcx | Transmission related fitness cost for class X |
| R1 | Fraction of population that is treated with antibiotic class 1 |
| R2 | Fraction of population that is treated with antibiotic class 2 |
| R3 | Fraction of population that is treated with antibiotic class 3 |

|  |  |
| --- | --- |
| **Compartment** | **Description** |
| Px | Prophylaxed by antibiotic class X |
| Wc | Colonised with WT |
| Wi | Clinically infected with WT |
| RcX | Colonised with bacteria resistant to antibiotic class X |
| RiX | Clinically infected with bacteria resistant to antibiotic class X |
| S | Suscpetible |