

# Humans vs. Mosquitoes

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## SYNOPSIS AND BACKGROUND

Worldwide, over 2.5 billion people are at risk of dengue. It is estimated that between 50 to 100 million cases of dengue fever and 250,000 to 500,000 cases of dengue hemorrhagic fever occur each year. Dengue is found in tropical and subtropical climates, in urban and semi-urban areas. It is found in over 100 countries. It is a virus spread by infected female mosquitoes (*Aedes aegypti*). There are four different viruses that cause dengue. After an infection, a person will develop lifelong immunity to that specific virus and transient immunity to the other three viruses.

There is no vaccine, cure, or specific treatment for dengue fever. However, prevention remains the only effective strategy to combat dengue. Dengue can be prevented through the control of the mosquito population with biological, chemical, and environmental methods. The Red Cross Red Crescent emphasizes dengue interventions should focus on the importance of cleaning breeding grounds more than using insecticides. Our game highlights the importance of prevention especially clearing breeding grounds.

Climate change will influence the transmission of dengue. Climate change fluctuations such as rain, warmer weather, and water shortages will all increase the prevalence of this disease. The Red Cross Red Crescent is one of the humanitarian agencies that are actively responding to the health care impacts of climate change by organizing education and cleaning campaigns to reduce the spread of dengue in countries such as Peru, Bolivia, and Paraguay. Climate change will place a greater burden on humanitarian agencies responding to dengue epidemics and they will require increased support to reach the most vulnerable populations worldwide.

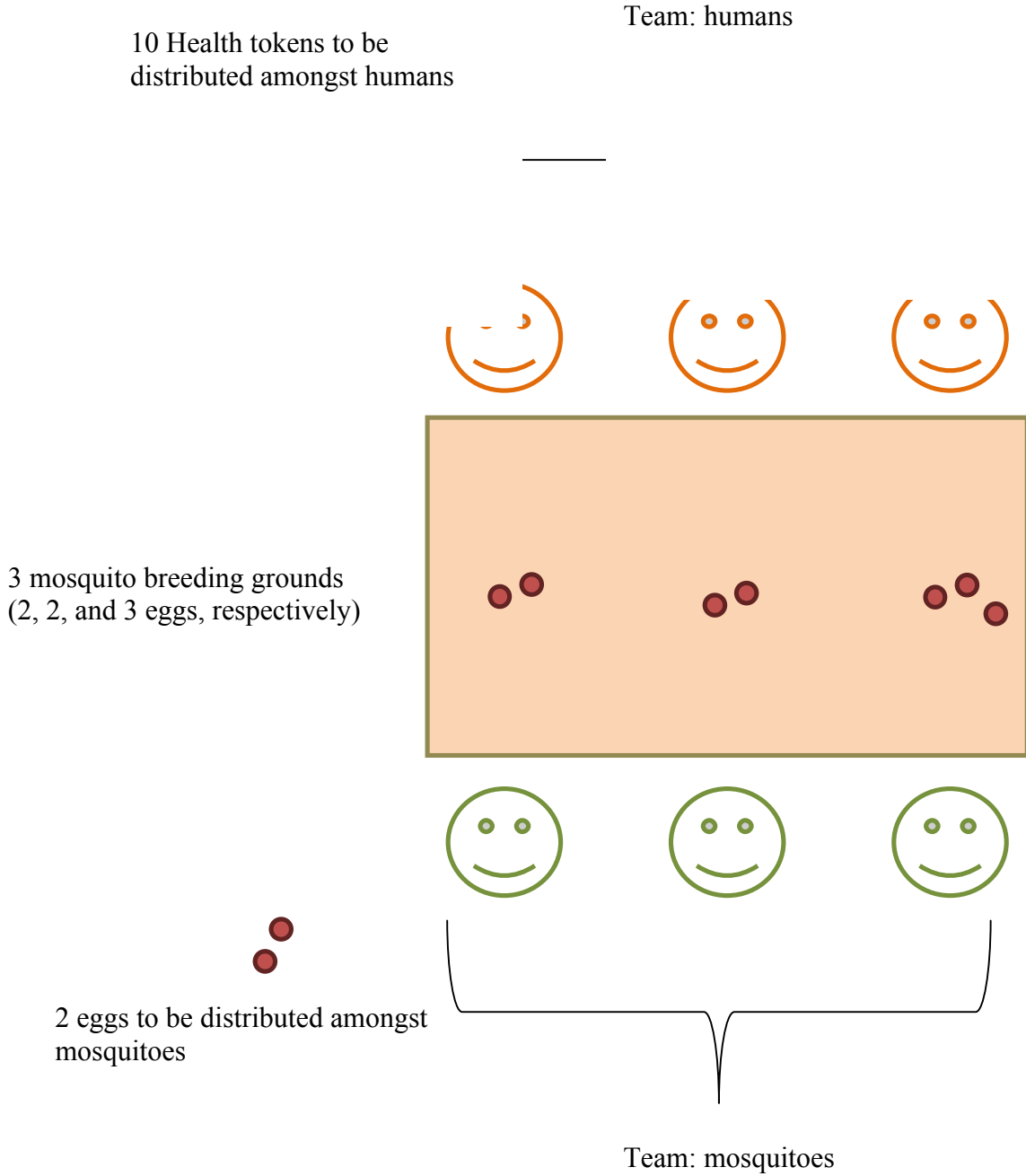
Although this game was designed with dengue in mind, it can be used for malaria or any other mosquito-borne disease; the mechanics are the same.

**GAME MATERIALS (6 PLAYERS AT A TIME)**

24 Tokens: these will be used interchangeably as eggs and health tokens  
Table

**GAME SETUP**

Ask players to stand around a table, with three on each side.



## RULES OF PLAY

Each player assumes the role of either a human or a mosquito. The game progresses in several rounds, during which the teams are allowed to discuss strategy for 30 seconds, after which the facilitator counts down from 3 and when the facilitator says “GO”, each person must take an action. Health tokens are redistributed by the facilitator depending on the result of the actions.

### 0. Explain ground rules

- Players should *expect* to be confused, both by the rules and throughout gameplay. Like in the real world, in this game the relationship between decisions and consequences can be complex... Being confused is a natural condition (which should dissipate as gameplay evolves and people figure out the implications of the various rules).
- The game is a simplified representation of reality. It is designed to amplify certain aspects that matter for the purpose of learning about resilience, while excluding other aspects of reality that, while relevant, would make the game too complicated. Players join the game accepting the rules – no challenging the rules during gameplay.

### 1. Possible Actions: practice round

- In each round, every player will need to take an action when the facilitator says GO. All actions will happen simultaneously, like in rock-paper-scissors.
- There are only two possible actions for each player, depending on which team they are part of. Actions are listed below with consequences.
- Ask teams to generate ideas before explaining the rules. Ask: what do mosquitoes do? (Answers: bite people). And what do humans do about mosquitoes? (Answers: various forms of protecting against bites and eradicating mosquitoes). After this discussion, introduce the following rules of gameplay.

<i>Team</i>	<i>Options</i>	<i>Action</i>	<i>Consequence</i>
<b>Mosquitoes</b> may either:	<b>Bite</b> one human	Point at chosen human	If human not protected, one health token from that human is given to each biting mosquito (becomes egg)
	<b>Lay an egg</b> in one breeding ground	Hold egg and point at chosen breeding ground	Egg is placed in breeding ground
<b>Humans</b> may either:	<b>Protect</b> against mosquito bite	Cross arms against chest	Human does not have to give any health tokens if bitten
	<b>Destroy</b> part of one breeding ground	Point at that breeding ground	One egg is removed from breeding ground by facilitator

- Clarification notes if needed:
  - While consultation with team members is encouraged, each player’s decisions are individual (nobody can force someone else to act in a certain way).
  - Players cannot share health tokens.
  - Humans can be bitten by more than one mosquito in a round.
  - If a human runs out of health tokens, that human is out of the game.
  - Every time one of the breeding grounds is emptied, one mosquito is randomly removed from the game. Mosquitoes cannot lay in an empty breeding ground.

- Play practice round! Count backwards from 3 and yell GO! Redistribute tokens accordingly.

## **2. Begin game**

- The object of the game: after 10 rounds, the game is finished. If there are an equal or greater number of humans than mosquitoes left in the game, the humans have won.
- Let players discuss strategy amongst their teams for about 1 minute (not too long).
- Begin round 1 by counting backward from three and yelling “GO”. Redistribute health tokens/eggs accordingly.
- Repeat until 10 rounds have been completed, or one of the teams is out.

## **3. Introduce new conditions affecting player decisions:**

If the humans have a definite advantage during the game, and one or more of the mosquito breeding grounds has been destroyed, the facilitator can step in and introduce “climate change”.

- Ask if any of the players has heard of climate change.
- Explain that, due to climate change, there are increased breeding grounds for mosquitoes, and so one new breeding ground has been established. Place 2 eggs on the table in one of the old breeding ground locations, and bring in another mosquito (this can be a new player).

If mosquitoes have a definite advantage, the facilitator can interfere and give the human team a few health tokens to distribute amongst themselves, calling this a “health intervention” on a related topic, such as nutrition.

## **4. End Game**

The game ends upon completion of the tenth round. Encourage discussion. Facilitators can start out with the following questions:

- How is this game realistic?
- How is this game not realistic?
- How would you improve this game?
- What are your insights about mosquito-borne diseases after playing this game?
- How did you feel when climate change happened?

End by thanking all participants.

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This game was developed in Fall 2011 by a team of graduate students and faculty at Yale University and Parsons The New School for Design for the Red Cross Red Crescent to use in the field to educate children about vector borne diseases and climate change. This game showcases innovative teaching tools in the field. Playing the game will allow children and policy makers alike to understand and engage on an emotional level with complex and abstract concepts of climate change and disease transmission. The game is freely available for not-for-profit use.

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