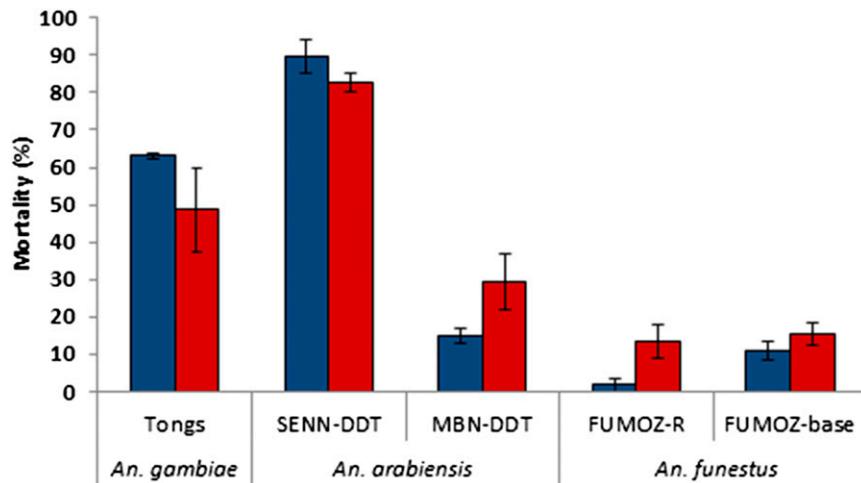
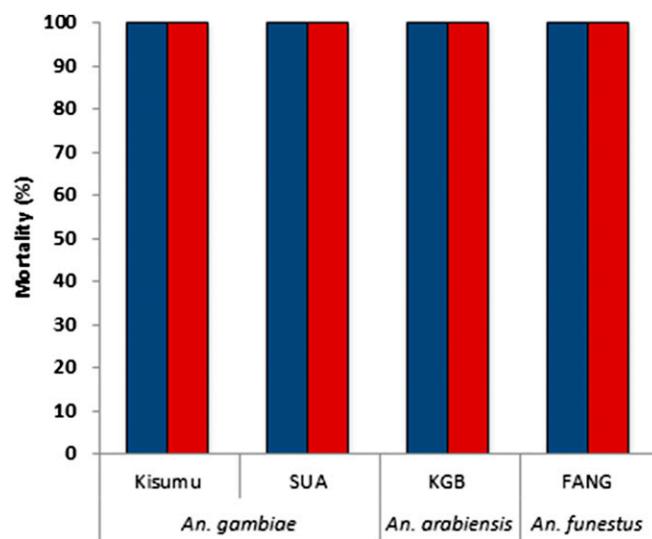


# Supporting Information

Andriessen et al. 10.1073/pnas.1510801112



**Fig. S1.** Average ( $\pm$  SE) mortality and knockdown rates of two groups of 25 female pyrethroid-resistant anopheline strains from the Vector Control Research Unit (VCRU) measured 1 h (blue bars) or 24 h (red bars) after 1-h exposure to 0.05% deltamethrin papers in WHO test tubes.



**Fig. S2.** Mortality rates of susceptible anopheline strains measured 24 h after 3-min exposure to PermaNet 2.0 netting containing 55 mg/m<sup>2</sup> deltamethrin (blue) or electrostatic netting containing 37 mg/m<sup>2</sup> deltamethrin (red).

**Table S1.** Corrected knockdown and mortality expressed as the percentage of the total number of exposed mosquitoes after 3-min exposure to standard deltamethrin-coated polyester (PermaNet 2.0) or electrostatic gauze with two concentrations of deltamethrin

Mosquito	Strain	Status	N	Knockdown, % (95% CI)	Mortality, % (95% CI)	PermaNet 2.0, DM 55 mg Al/m <sup>2</sup>		Electrostatic gauze, DM 3.7 mg Al/m <sup>2</sup>		Electrostatic gauze, DM 37 mg Al/m <sup>2</sup>	
						N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
<i>Anopheles gambiae</i>	Kisumu	Susceptible	40	97.5 (92.6–100)	100	42	100	100	100	40	100
	SUA	Susceptible	54	100	100	51	100	100	100	55	100
	Tiassale	Resistant	47	70.6 (62.0–79.1)	9.6 (1.2–18.0)	47	93.2 (86.3–100)	100	100	49	97.9 (94.0–100)
	Tongs	Resistant	55	60.0 (47.0–72.9)	58.2 (24.9–51.1)	46	95.7 (89.8–100)	95.7 (89.8–100)	100	57	100
	KBG	Susceptible	45	100	100	52	100	100	100	53	100
	SENN_DDT	Resistant	52	88.5 (79.9–97.1)	76.9 (65.5–88.3)	45	75.6 (63.1–88.1)	82.2 (71.0–93.4)	55	100	100
	MBN-DDT	Resistant	48	12.5 (3.1–21.9)	37.5 (23.8–51.2)	53	88.7 (80.1–97.3)	96.2 (91.1–100)	54	100	100
	FANG	Susceptible	48	100	100	53	100	100	100	52	100
<i>Anopheles funestus</i>	Fumoz-R	Resistant	47	8.5 (0.5–16.5)	10.6 (1.8–19.4)	46	17.4 (6.4–23.4)	39.1 (25.0–53.1)	46	95.7 (89.8–100)	63.0 (49.1–76.9)
	Fumoz-base	Resistant	51	5.9 (0.0–12.4)	7.8 (0.4–15.2)	51	13.7 (4.3–23.1)	49.0 (35.3–62.7)	53	92.5 (88.4–99.6)	83.0 (72.8–93.2)
	I2C-CX	Unknown	30	43.3 (25.7–50.9)	40.0 (22.6–57.4)	50	10.0 (1.8–18.2)	82.0 (71.4–92.6)	31	93.5 (86.4–100)	100
	Wild-type	Unknown	41	2.4 (0.0–7.1)	4.9 (0.0–11.6)	48	52.1 (38.0–66.2)	95.8 (90.1–100)	36	56.5 (42.2–70.8)	93.5 (86.4–100)
<i>Culex quinquefasciatus</i>	I2C-AE	Unknown	32	84.4 (71.9–96.9)	87.5 (76.1–98.9)	52	73.1 (61.0–85.3)	92.3 (85.1–99.6)	50	100	100

Knockdown and mortality rates are shown with 95% CIs calculated for each pooled sample proportion. DM, deltamethrin.

**Table S2.** Corrected knockdown and mortality as a percentage of the total number of exposed mosquitoes after 5-s contact exposure to PermaNet 2.0 polyester coated with deltamethrin and deltamethrin-dusted electrostatic gauze with two concentrations of active ingredient

Mosquito	Strain	Status	N	Knockdown, % (95% CI)	Mortality, % (95% CI)	PermaNet 2.0, DM 55 mg Al/m <sup>2</sup>		Electrostatic gauze, DM 3.7 mg Al/m <sup>2</sup>		Electrostatic gauze, DM 37 mg Al/m <sup>2</sup>	
						N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
<i>Anopheles gambiae</i>	Kisumu	Susceptible	48	100	100	42	100	100	100	40	100
	Tiassale	Resistant	47	63.8 (50.1–76.3)	6.4 (0.0–13.5)	51	15.7 (5.7–25.7)	37.3 (24.0–50.6)	50	96.0 (90.5–100)	82.0 (71.4–92.6)
	I2C-CX	Unknown	39	20.7 (6.0–35.4)	20.7 (6.0–35.4)	38	2.6	50.0 (34.1–65.9)	38	57.1 (38.7–75.5)	78.6 (63.3–93.9)
	Wild-type	Unknown	50	0.0	40.0 (26.5–53.5)	50	4.0	60.0 (46.5–73.5)	50	38.0 (24.5–51.5)	60.0 (46.5–73.5)
	I2C-AE	Unknown	42	31.0	31.0 (17.1–44.9)	45	46.7	62.2 (48.1–76.3)	50	100	100
	Kisumu	Susceptible	48	100	100	42	100	100	100	40	100
	Tiassale	Resistant	47	63.8 (50.1–76.3)	6.4 (0.0–13.5)	51	15.7 (5.7–25.7)	37.3 (24.0–50.6)	50	96.0 (90.5–100)	82.0 (71.4–92.6)
	I2C-AE	Unknown	42	31.0	31.0 (17.1–44.9)	45	46.7	62.2 (48.1–76.3)	50	100	100

Knockdown and mortality rates are shown with 95% CIs calculated for each pooled sample proportion. DM, deltamethrin.

**Table S3. Origin, rearing, strain, and exposure specifics of the susceptible mosquitoes and the mosquito strains with undefined resistance used in the insecticide bioassays**

Mosquito species	Susceptible mosquitoes					Mosquitoes with undefined resistance	
Mosquito species	<i>An. gambiae</i> s.s.	<i>An. gambiae</i> s.s.	<i>An. arabiensis</i>	<i>An. funestus</i>	<i>Ae. aegypti</i>	<i>Cx. quinquefasciatus</i>	<i>Cx. quinquefasciatus</i>
Mosquito strain	Kisumu	SUA	KGB	FANG	I2C-AE	I2C-CX	Field-collected
Origin	Kisumu, Kenya	Suakoko, Liberia	Kanyembe, Zimbabwe	Southern Angola	Aruba	USA	Kilombero, Tanzania
Reared by	LSTM (LITE)	VCRU	VCRU	VCRU	In2Care	In2Care	N/A
Selected resistance	None	None	None	None	None (field-collected 01/2012)	None	None (field-collected 03/2014)
Resistance profile	Fully susceptible	Fully susceptible	Fully susceptible	Fully susceptible	Unknown	Fully susceptible	Fully susceptible
Exposure date	13/03/14	28/11/14	26/11/14	30/11/14	10/02/14	17/02/14	28/03/14
Mosquito age	3–6 d	2–4 d	2 d	2 d	3–6 d	3–4 d	2 d

LST (LITE), Liverpool School of Tropical Medicine (Liverpool Insect Testing Establishment).

**Table S4. Origin, rearing, strain, resistance status, and exposure specifics of mosquito strains with well-defined resistance profiles used in the insecticide bioassays**

Mosquito species	<i>An. gambiae</i> s.s.	<i>An. gambiae</i> s.s.	<i>An. arabiensis</i>	<i>An. arabiensis</i>	<i>An. funestus</i>	<i>An. funestus</i>
Mosquito strain	Tiassale	Tongs	SENN-DDT	MBN-DDT	Fumoz-R	Fumoz-base
Origin	Tiassale, Burkina Faso	Tongan, Ivory Coast	Sennar, Sudan	KwaZulu Natal, South Africa	Mozambique	Mozambique
Reared by	LSTM (LITE)	VCRU	VCRU	VCRU	VCRU	VCRU
Selected resistance	Pyrethroid resistance	Multiple, no selection since 2010	DDT resistance (selected since 1995)	DDT resistance (selected until 2013)	Permethrin resistance (selected until 2001)	Naturally multiple resistant
Resistance profile	Kdr and P450s	Not known	Kdr, GSTs, P450s, esterases	Kdr, P450s, GSTs, esterases	P450s, GST	P450, GST
Exposure date	13/03/2014	26/11/14	25/11/14	01/12/2014	25/11/14	27/11/14
Mosquito age	2–4 d	3 d	3 d	2 or 3 d	2–4 d	2–4 d

LST (LITE), Liverpool School of Tropical Medicine (Liverpool Insect Testing Establishment).