SUPPLEMENTARY MATERIALS

Mosquito control workers in Malaysia: Is lifetime occupational pesticide exposure associated with poorer neurobehavioral performance?

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Table S1 Tasks for each job title

Job title	Task number	Description
Environmental Health Inspector	1	Non-pesticide related task
	2	Supervise public health assistant and general worker (‘Fogger’) during mixing water-based pesticide (outdoor/indoor) - for both thermal and ULV spraying
	3	Supervise public health assistant and general worker (‘Fogger’) during mixing oil-based pesticide (outdoor/indoor) - for both thermal and ULV spraying
	4	Supervise public health assistant and general worker (‘Fogger’) during mixing undiluted pesticide for ULV spraying (outdoor)
	5	Supervise public health assistant and general worker (‘Fogger’) during thermal spraying (outdoor only)
	6	Supervise public health assistant and driver during ULV spraying
Public Health Assistant	1	Non-pesticide related task
	2	Mixing of pesticide (water-based) (outdoor/indoor) - for both thermal and ULV spraying
	3	Mixing of pesticide (oil-based) (outdoor/indoor) - for both thermal and ULV spraying
	4	Mixing of undiluted pesticide for ULV spraying (outdoor)
	5	Supervise thermal spraying inside building
	6	Supervise thermal spraying outside building
	7	Conduct ULV spraying (water-based pesticide)
	8	Conduct ULV spraying (oil-based pesticide)
	9	Conduct ULV spraying (undiluted pesticide)
General worker (“Fogger”)	1	Non-pesticide related task
	2	Assisting in mixing of pesticide (water-based) (outdoor/indoor) - for both thermal and ULV spraying
	3	Assisting in mixing of pesticide (oil-based) (outdoor/indoor) - for both thermal and ULV spraying
	4	Conduct thermal spraying inside building
	5	Conduct thermal spraying outside building
Driver	1 and 2	Non-pesticide related task
	3	Driving ULV spraying vehicle (water-based pesticide)
	4	Driving ULV spraying vehicle (oil-based pesticide)
	5	Driving ULV spraying vehicle (undiluted pesticide)

Table S2 Guidance materials for pesticide inhalation exposure modelling

Symbol	Definition	Value
ε_i	• Water-based pesticide (Water content:90 - 98 %): Permethrin, d,d,T-cyphenothrin, pirimiphos-methyl and fenithrothion	0.95
	• Diesel-based pesticide (Diesel content:90 - 98 %): Permethrin, d,d,T-cyphenothrin, pirimiphos-methyl and fenithrothion	0.75
	• Undiluted pesticide (Fenithrothion and Malathion)	0.8
h	• Hand-carried thermal spraying	10
	• Vehicle-mounted ULV spraying	20
	• Mixing	0.1
$1-\eta_{lv}$	• No local control	1
	• Local control available	0.8 – 0.9
ε_p	• Good housekeeping	0
	• Poor housekeeping (but the situation is generally controlled)	0.1
	• Very poor housekeeping (i.e. very dusty)	0.3
d_{gv}	The general ventilation parameter can be determined by using the information on room volume and air changes per hour	Please refer #
$1 - \eta_{rpe}$	Based on eras:	
	• 1970 – 1989 (No respirator use)	0
	• 1990 – 2004 (Limited respirator use)	0.5
	• 2005 – 2014 (Improved respirator use)	0.7

Note:
ε_i = Intrinsic emission; h = Handling; $1-\eta_{lv}$ = Local control; t_a = the time that the source is actively emitting (%); ε_p = passive emission; d_{gv} = General ventilation; $1 - \eta_{rpe}$ = Respiratory Protective Equipment. Units for all parameters are dimensionless
#Guidance value for general ventilation

Room volume	0.3 air changes per hour	1 air changes per hour	3 air changes per hour	10 air changes per hour
Near-Field Multipliers				
30 m^3	37	18	7	3
100 m^3	13	6	2.9	1.6
300 m^3	5.1	2.7	1.6	1.2
1000 m^3	2.2	1.5	1.2	1
3000 m^3	1.4	1.2	1.1	0.5
Far Field Multipliers				
30 m^3	37	17	6	2
100 m^3	12	5	2	0.6
300 m^3	4.1	1.7	0.6	0.2
1000 m^3	1.2	0.5	0.2	0.07
3000 m^3	0.4	0.2	0.1	0.05

Note:
Near-field: a volume around the worker whose exposure is being investigated
Far-field: the remainder of the work environment.

Table S3 Guidance materials to predict the volume of total pesticides deposited on the workers dermal

Symbol	Definition	Value	Units
$V_{Overspray}$	Volume rate of spraying (thermal & ULV) - Overspray		
	• Thermal spraying	250	mL/min
	• ULV spraying	333.33	mL/min
T	Time spraying		
	• Thermal spraying	45	min
	• ULV spraying	60	min
	Time mixing	30	min
η_{spray}	Technique related deposition efficiency factor		
	• Thermal spraying	0.9 (0-1)	Dimensionless
	• ULV spraying	0.8 (0-1)	Dimensionless
O	Object factor		
	• Thermal & ULV spraying	3 (0.3 – 3)	Dimensionless
EV	Evaporation factor	0.3	Dimensionless
V_{NT}	Ventilation factor		
	• Outdoor	0.3	Dimensionless
	• Indoor	0.1	Dimensionless
WV	Worker to ventilation orientation factor (spraying and mixing)	0.3	Dimensionless
P	Posture factor		
	• Thermal spraying	1	Dimensionless
	• ULV spraying	0.3	Dimensionless
	• Mixing	1	Dimensionless
D	Distance factor		
	• Thermal or ULV spraying	1	Dimensionless
	• Mixing	3	Dimensionless
V_{TOT}	**PHA**		
	• Thermal spraying (indoor)	16.4	mL
	• Thermal spraying (outdoor)	1.82	mL
	• ULV spraying	0.58	mL
	• Thermal spraying (indoor)	16.4	mL
	• Thermal spraying (outdoor)	1.82	mL
	• ULV spraying	0.58	mL
	“Fogger”		
	• Thermal spraying (indoor)	54.68	mL
	• Thermal spraying (outdoor)	6.08	mL
	Driver		
	• ULV spraying	0.58	mL

Model validation

i. Inhalation

Generally, there was a ‘fair’ relationship between the log-transformed measured and estimated exposure concentration (r_s = 0.44) even though the correlation was not significant (Figure S1). The measurement of the exposure concentration ranged from 0.001 – 0.082 ppm.hours. The assessment showed a positive bias based on the ratio of the geometric mean of the estimated exposure level to the corresponding geometric mean measured exposure level. The slope of the regression line was not significant (p = 0.136).

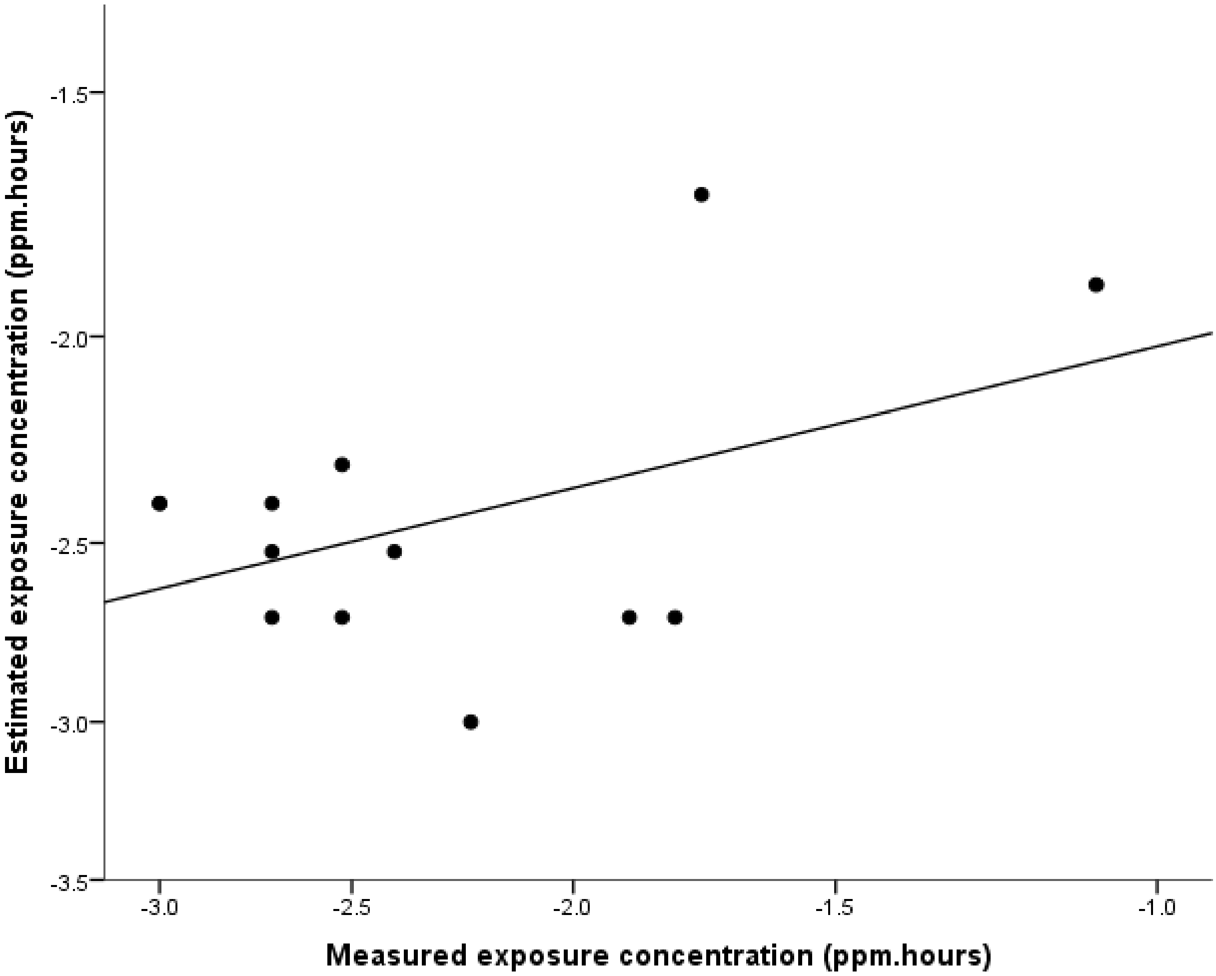

Figure S1 Comparison between log-transformed measurement exposure concentration and log-transformed estimated exposure concentration (ppm.hours)

Table S4 Summary of the results for validation study

Number of measurement	Range of average exposure level (ppm.hours)	Span[a]	Bias[b]	Slope[c]	Correlation[d]
13	0.001 – 0.082	82	7.46	1.9	0.4

[a] Span=the ratio of the highest to lowest measured exposure level.
[b] Bias=the ratio of the geometric mean of the estimated exposure level to the corresponding geometric mean measured exposure level
[c] Slope of the regression line of measured and estimated exposure level.
[d] Correlation between the log-transformed estimated and measured exposure level.

ii. Dermal

Table S5 summarises the comparison between estimated and measured skin loading of pesticides. Mixing tasks showed an estimated:measured ratio close to 1 (0.24-1.8) for the three pesticides (permethrin (aqua resigen), pirimiphos-methyl and fenithrothion). Similarly, close agreement was also observed for ULV spraying for both permethrin (aqua resigen) (ratio:0.6) and d, d, T-cyphenothrin (ratio 0.7). However, for thermal spraying, the skin loading of permethrin (aqua resigen) (ratio 37.3) and pirimiphos-methyl (ratio 7.9) showed gross overestimation compared to the measured value. These overestimated values may be due to inconsistencies in the measured values due to skin wiping problems given that during thermal spraying wipes were gathered after removal of PPE. Figure S1 shows that values for mixing and ULV spraying are close to the 1:1 line but values for thermal spraying are much higher. Overall, the relationship between estimated and measured skin loading of pesticides for all three tasks showed a 'fair' relationship (r_s = 0.38, p = 0.403) even though the correlation was not significant.

Table S5 Comparison between estimated and measured skin loading (μg/cm^2)

Tasks	Pesticides	Skin loading (μg/cm^2)		Ratio
		Estimated	Measured	
Mixing	Permethrin (aqua resigen)	0.046	0.037	1.3
	Pirimiphos-methyl	0.447	0.25	1.8
	Fenithrothion	0.456	1.877	0.24
Thermal spraying	Permethrin (aqua resigen)	1.367	0.037	37.3
	Pirimiphos-methyl	13.25	1.687	7.9
ULV spraying	Permethrin (aqua resigen)	0.387	0.595	0.6
	d, d, T-cyphenothrin	0.226	0.323	0.7
Overall median		0.447	0.323	1.4

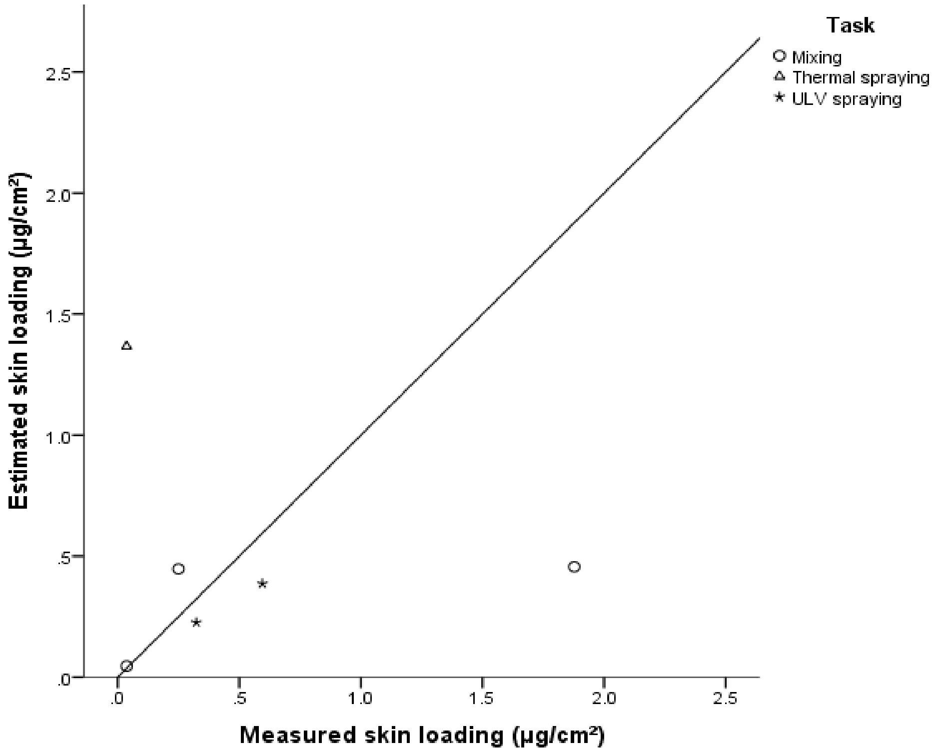

Figure S1 Comparison between estimated and measured skin loading (µg/cm^2). Note that one outlier for thermal spraying is not shown using this scale.

Worked example for exposure reconstruction

Subject ID: 195

Job title: Public Health Assistant

Table S6: Work history

Employer	Job title	Date	Eras
Health District Office A	Public Health assistant	1980 – 1988	1970 - 1989
Health District Office B	Public Health assistant	1989 – 2004	1990 - 2004
Health District Office C	Public Health assistant	2005 - current	2005 - 2014

Based on the subject's work history (Table S6), he has worked as a public health assistant (PHA) since 1980 in three different health district offices under the Ministry of Health, Malaysia throughout the three eras. His job includes mixing pesticides for thermal and ULV spraying, which takes place outside the building. Besides that, he also supervises "fogger" during thermal spraying for both indoor and outdoor applications and is in charge of ULV spraying with the driver's assistance. It was observed that most of the PHA did not wear complete PPE. Table S7 explains the specifics of his job description.

Table S7 Task description for Public Health assistant

Task number	Description
Task 1	Non-pesticide related task
Task 2	Mixing of pesticide (water-based)-(indoor/outdoor) (only begin in 1990)
Task 3	Mixing of pesticide (oil-based)-(indoor/outdoor)
Task 4	Mixing of pesticide (undiluted for ULV) (outdoor)
Task 5	Supervise spraying inside building
Task 6	Supervise spraying outside building
Task 7	Conduct ULV spraying (water-based)
Task 8	Conduct ULV spraying (oil-based)
Task 9	Conduct ULV spraying (undiluted)

i. Inhalation reconstruction exposure

An estimated inhalation pesticide exposure was calculated for a job title (as Public health assistant) based on the specific tasks using the model by Cherrie and Schneider (1999) (Table S7). Then, the mass of pesticide received by inhalation (U_{inh}) for each job title and tasks was calculated to give a total pesticide intake for each era (Table S8) using the equation, $U_{inh} = (R_{vol} \cdot T \cdot C_{air}) / RPE$. (Note: Respiratory minute volume ($m^3 \cdot min^{-1}$) (R_{vol}), exposure time (T), the concentration of pesticide in air (mg/m^3) (C_{air}) and respiratory protective equipment (RPE)).

Table S8: Inhalation exposure reconstruction calculation for Public Health assistant (Guidance materials as in Table S2)

								C (estimated inhalation exposure)		
Eras/tasks	**E_i**	**h**	**$1 - n_{lv}$**	**t_a**	**E_p**	**$1 - n_{ppe}$**	**d_{gv}**	**exposure unit.hours**	**ppm.hours[a]**	**ppm[b]**
1970 - 1989										
Task 3 (indoor)	0.75	0.1	1	0.5	0.3	1	3.3	1.11	0.008	0.02
Task 3 (outdoor)	0.75	0.1	1	0.5	0.3	1	2.1	0.71	0.005	0.01
Task 4	0.8	0.1	1	0.5	0.3	1	2.1	0.71	0.005	0.01
Task 5	0.75	15	1	0.75	0.1	1	0.5	4.27	0.03	0.04
Task 6	0.75	15	1	0.75	0.1	1	1	8.54	0.06	0.09
Task 8	0.75	20	0.2	1	0.1	1	1	3.1	0.02	0.02
Task 9	0.8	20	0.2	1	0.1	1	1	3.3	0.02	0.02
1990 - 2004										
Task 2 (indoor)	0.95	0.1	1	0.5	0.3	0.5	3.3	0.57	0.004	0.009
Task 2 (outdoor)	0.95	0.1	1	0.5	0.3	0.5	2.1	0.36	0.003	0.006
Task 3 (indoor)	0.75	0.1	1	0.5	0.3	0.5	3.3	0.56	0.005	0.008
Task 3 (outdoor)	0.75	0.1	1	0.5	0.3	0.5	2.1	0.35	0.003	0.005
Task 4	0.8	0.1	1	0.5	0.3	0.5	2.1	0.36	0.003	0.005
Task 5	0.95	15	1	0.75	0.1	0.5	0.5	2.69	0.02	0.03
Task 6	0.75	15	1	0.75	0.1	0.5	1	4.27	0.03	0.04
Task 7	0.95	20	0.1	1	0.1	0.5	1	1	0.008	0.008
Task 8	0.75	20	0.1	1	0.1	0.5	1	0.8	0.006	0.006

Task 9	0.8	20	0.1	1	0.1	0.5	1	0.85	0.006	0.006
2005 - 2014										
Task 2 (indoor)	0.95	0.1	1	0.5	0.3	0.3	3.3	0.34	0.003	0.0052
Task 2 (outdoor)	0.95	0.1	1	0.5	0.3	0.3	2.1	0.22	0.002	0.0032
Task 3 (indoor)	0.75	0.1	1	0.5	0.3	0.3	3.3	0.33	0.003	0.0052
Task 3 (outdoor)	0.75	0.1	1	0.5	0.3	0.3	2.1	0.21	0.002	0.0032
Task 4	0.8	0.1	1	0.5	0.3	0.3	2.1	0.21	0.002	0.0032
Task 5	0.95	15	1	0.75	0.1	0.3	1.5	4.85	0.037	0.049
Task 6	0.75	15	1	0.75	0.1	0.3	1	2.56	0.02	0.03
Task 7	0.95	20	0.1	1	0.1	0.3	1	0.6	0.005	0.005
Task 8	0.75	20	0.1	1	0.1	0.3	1	0.48	0.004	0.004
Task 9	0.8	20	0.1	1	0.1	0.3	1	0.51	0.004	0.004

[a] Conversion factor: 1 exposure unit.hours = 0.008 ppm.hours (based on a comparison between estimated and current measurement).

[b] Converted from ppm into mg/m^3 based on type of pesticide (i.e. Task 5 (era: 1970 – 1989), Pirimiphos methyl (Organophosphate), molecular weight = 305.33 g/mol, (0.04 ppm × 24.45) / (305.33 g/mol) = 1.45 mg/m^3)).

Table S9: Total mass of inhaled pesticides intake by eras per shift

Eras	Area[*]	U_{inh} (mg)
1970 - 1989	Indoor	19.9
	Outdoor	19.6
1990 - 2004	Indoor	19.2
	Outdoor	18.2
2005 - 2014	Indoor	14.4
	Outdoor	13.7

[*]classify based on mixing task working environment

ii. Dermal reconstruction exposure

The exposure modelling method devised by Semple et al. (2001b) was utilized to reconstruct workers' dermal pesticides exposure based on the guidance materials in Table S3. Then, total dermal uptake resulting from overspray (U_{derm_os}) and leak (U_{derm_leak}) was calculated. The overspray was determined based on the uptake of pesticide from clothing (DU_{CL}) and bare skin area (DU_{SK}) (Table S10). Whereas, the leak calculation was based on contaminated skin surface area ((A_{con}) or (A_{di})), in cm^2 and the rate of pesticide flux across the skin ((J_{con}) or (J_{di})), in ($mg.cm^{-2}.h^{-1}$) (Table S11). Finally, the total dermal uptake from both the overspray and leak is calculated (Table S12).

Table S10 Dermal uptake from overspray

Spraying Technique	Pesticides	Dermal uptake of pesticide from overspray (mg) $U_{derm\_os} = DU_{CL}^{a} + DU_{SK}^{a}$		
		Era		
		1970 – 1989	1990 – 2004	2005 – 2014
Thermal (indoor)	Permethrin (Resigen)	7.77	6.011	4.252
	Permethrin (Aqua resigen)	4.201	3.249	2.299
	d,d,T-cyphenothrin	0.771	0.596	0.421
	Pirimiphos-methyl	9.138	7.069	5
	Fenithrothion	129.96	100.56	71.13
	Malathion	152.07	117.64	83.21
Thermal (outdoor)	Permethrin (Resigen)	1.121	0.868	0.614
	Permethrin (Aqua resigen)	0.606	0.469	0.332
	d,d,T-cyphenothrin	0.111	0.086	0.061
	Pirimiphos-methyl	1.319	1.02	0.722
	Fenithrothion	18.76	14.51	10.26
	Malathion	21.95	15.94	12.01
Ultra low volume (ULV)	Permethrin (Resigen)	0.354	0.274	0.194
	Permethrin (Aqua resigen)	0.677	0.524	0.371
	d,d,T-cyphenothrin	0.035	0.027	0.019
	Pirimiphos-methyl	0.417	0.322	0.228
	Fenithrothion	5.929	4.587	3.244
	Malathion	6.936	5.366	3.795

[a]Calculation of pesticide uptake from clothing and bare skin areas

Technique	**Pesticides**	**Uptake of pesticide from clothing (mg) $DU_{CL} = UP_{CL} \times COVER_{CL}$**			**Uptake of pesticide from bare skin areas (mg) $DU_{SK} = UP_{SK} \times COVER_{SK}$**		
		Era			**Era**		
		1970 – 1989	**1990 – 2004**	**2005 – 2014**	**1970 – 1989**	**1990 – 2004**	**2005 – 2014**
Thermal (indoor)	Permethrin (Resigen)	0.439	0.513	0.586	7.331	5.498	3.665
	Permethrin (Aqua resigen)	0.238	0.277	0.317	3.963	2.972	1.982
	d,d,T-cyphenothrin	0.044	0.051	0.058	0.727	0.545	0.363
	Pirimiphos-methyl	0.517	0.603	0.689	8.621	6.466	4.311
	Fenithrothion	7.358	8.584	9.81	122.6	91.97	61.32
	Malathion	8.608	10.04	11.48	143.46	107.59	71.73
Thermal (outdoor)	Permethrin (Resigen)	0.063	0.074	0.085	1.058	0.793	0.529
	Permethrin (Aqua resigen)	0.034	0.04	0.046	0.572	0.428	0.286
	d,d,T-cyphenothrin	0.006	0.007	0.008	0.105	0.079	0.052
	Pirimiphos-methyl	0.075	0.087	0.099	1.244	0.933	0.622
	Fenithrothion	1.062	1.239	1.419	17.69	13.27	8.849
	Malathion	1.242	0.41	1.656	20.7	15.53	10.35
ULV	Permethrin (Resigen)	0.02	0.023	0.027	0.334	0.251	0.167
	Permethrin (Aqua resigen)	0.038	0.044	0.051	0.639	0.479	0.319
	d,d,T-cyphenothrin	0.002	0.002	0.003	0.033	0.025	0.017
	Pirimiphos-methyl	0.024	0.028	0.031	0.393	0.295	0.197
	Fenithrothion	0.337	0.392	0.447	5.593	4.195	2.797
	Malathion	0.393	0.458	0.523	6.543	4.908	3.272

UP_{CL}: Uptake for pesticide through clothed areas over exposed time ($mg.cm^{-2}$), UP_{SK}: Uptake for pesticide through bare skin areas over exposed time ($mg.cm^{-2}$), $COVER_{CL}$: Total coverage by droplets depositing on the clothing (cm^2), $COVER_{SK}$: Total coverage by droplets depositing on the skin (cm^2).

Table S11 Dermal uptake from leak during mixing and thermal spraying which contaminates hands, forearms and legs

Technique	**Pesticides**	**Dermal uptake of pesticide from leak (mg)** $U_{derm\_leak} = ((A_{con})$ **or** $(A_{di})) \times ((J_{con})$ **or** $(J_{di}))$		
		Era		
		1970 – 1989	**1990 – 2004**	**2005 – 2014**
Mixing	Permethrin (Resigen)	152.75	81.46	43.49
	Permethrin (Aqua resigen)	82.58	44.04	23.51
	d,d,T-cyphenothrin	30.55	16.29	8.69
	Pirimiphos-methyl	369.85	179.64	100.83
	Fenitrothion	355.55	165.92	95.21
	Malathion	783.77	397.35	217.9

Note: Leak for spraying not calculated because this public health assistant not involved in spraying activity.

Table S12 Total dermal uptake from overspray and leak

Total dermal (mg) by eras $U_{derm\_tot} = U_{derm\_os} + U_{derm\_leak}$		
1970 - 1989	**1990 - 2004**	**2005 - 2014**
3007.8	1788.4	1000.6

iii. Combining pesticide intake from inhalation (U_{inh}) and dermal (U_{derm_tot})

Next, the total mass of pesticide received by both inhalation and dermal routes per shift (U_{tot}) as a public health assistant was calculated (Table S13).

Table S13 Total mass of pesticides intake by eras per shift

Eras	$U_{tot} = U_{inh} + U_{derm\_tot}$ **(g)**
1970 - 1989	3
1990 - 2004	1.8
2005 - 2014	1

iv. Estimating total lifetime pesticide intake for a worker

Finally, the total lifetime pesticide intake for a worker (subject ID: 195) was calculated by using the information gathered from the occupational history interview (Table S14). The following are the equations:

1. Pesticide intake for each era = intake of pesticide per shift × average days of task per year × years of task
2. Total lifetime pesticide intake = sum of pesticide intake for each era

Table S14 Total estimated lifetime pesticide intake

Era (s) of working	Intake of pesticide per shift (g)	Average days of task per year	Years of task	Pesticide intake for the era (g)
1970 - 1989	3	208	9	5616
1990 – 2004	1.8	208	14	5241.6
2005 – 2014	1	208	9	1872
		Estimated total lifetime pesticide intake		12729.6

Table S15 CANTAB tests description

Domain	Tests	Description	Test score
Attention	Match to Sample Visual Search (MTS)	Match to Sample Visual Search (MTS) is a matching test, with a speed/accuracy trade-off. It is a simultaneous visual search task with response latency dissociated from movement time. Efficient performance on this task requires the ability to search among the targets and ignore the distractor patterns which have elements in common with the target.	Higher percentage correct is better
	Reaction time (RT)	Reaction Time (RT) is a latency task with a comparative history (the five choice tasks) and uses a procedure to separate response latency from movement time. It is more useful than CRT or SRT where it is necessary to control for tremor	Lower millisecond is better
Visual memory	Pattern Recognition Memory (PRM)	This is a test of visual pattern recognition memory in a 2-choice forced discrimination paradigm. This test is often used, in conjunction with Spatial Recognition Memory (SRM), before the Paired Associates Learning (PAL) test; as both these tests help to train the subject for PAL PRM and SRM contain different elements of PAL, and the results considered together help to decide on the exact nature of the cognitive deficit being considered.	Higher percentage correct is better

	Spatial Recognition Memory (SRM)	This is a test of visual-spatial recognition memory in a 2-choice forced discrimination paradigm. This test is often used, in conjunction with Pattern Recognition Memory (PRM), before the Paired Associates Learning (PAL) test; as both these tests help to train the participant for PAL. PRM and SRM contain different elements of PAL, and the results considered together help to decide on the exact nature of the cognitive deficit being considered.	Higher percentage correct is better
	Paired Associated Learning (PAL)	This test assesses visual memory and new learning and is a useful tool for assessing individuals with Mild Cognitive Impairment.	Lower total error (adjusted) is better
Executive function	Spatial Span (SSP)	Spatial Span assesses working memory capacity and is a visuospatial analogue of the Digit Span test.	Higher span length is better
Induction	Motor Screening Task (MOT)	The Motor Screening Task is typically administered at the beginning of a battery and serves as a simple introduction to the touch screen for the participant. If a participant is unable to comply with the simple requirements of this task, it is unlikely that they will be able to complete other tasks successfully. This task, therefore, screens for visual, movement and comprehension difficulties	Lower mean error ('Pixel' unit) is better

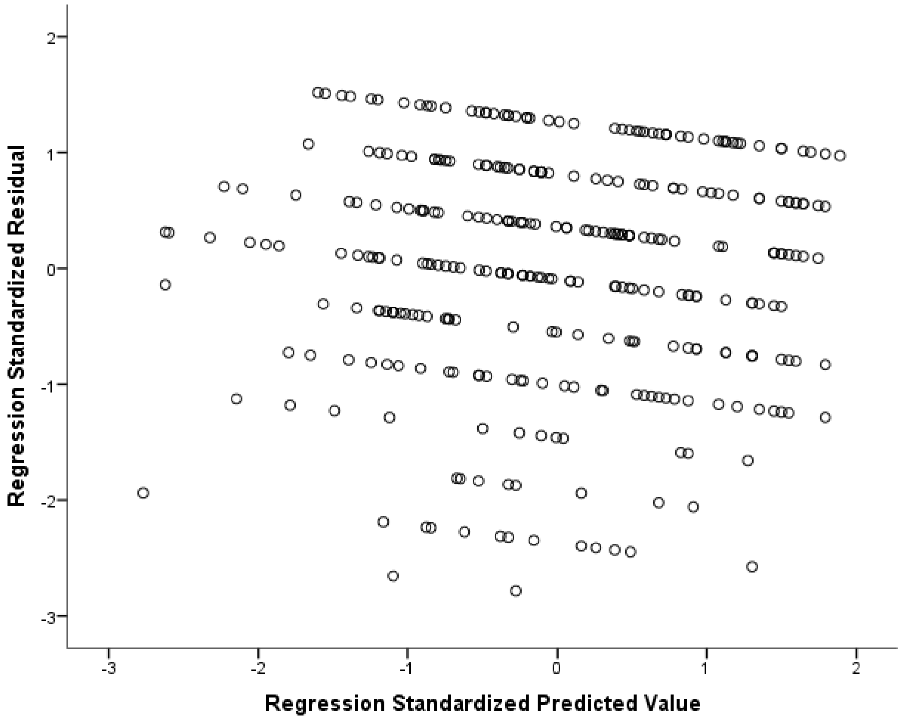

Figure S16a Scatter plot of standardized residual vs standardised predicted value (Match to Sample Visual Search (MTS)).

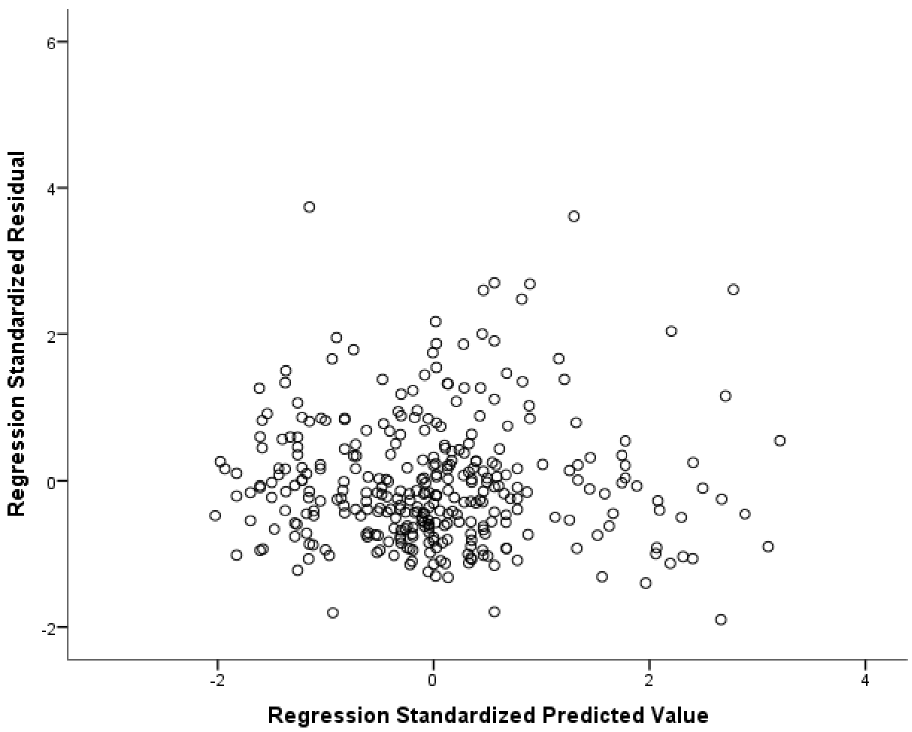

Figure S16b Scatter plot of standardized residual vs standardised predicted value (Reaction Time (RT)).

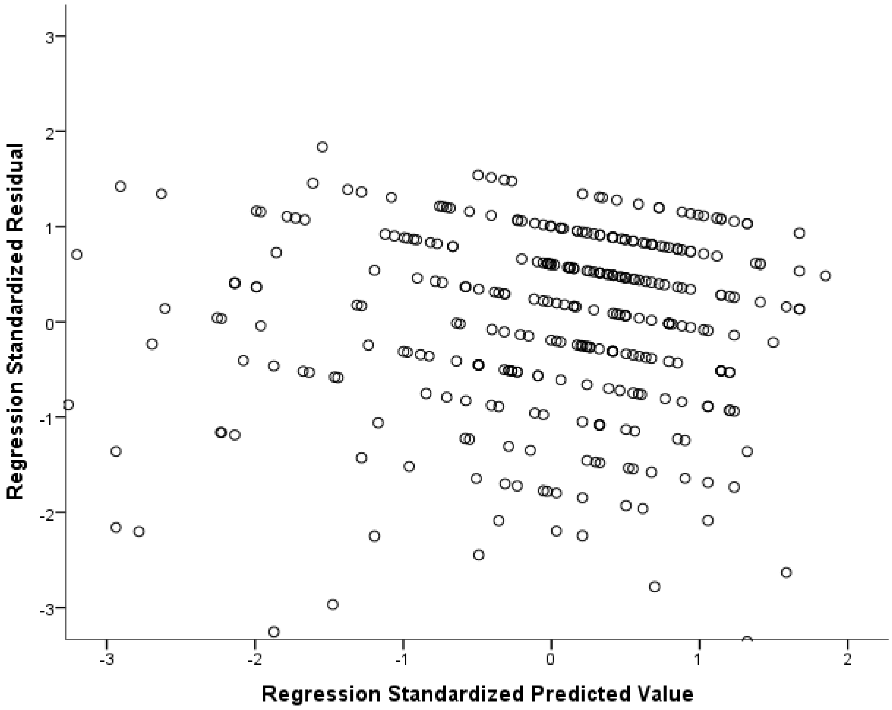

Figure S16c Scatter plot of standardized residual vs standardised predicted value (Pattern Recognition Memory (PRM)).

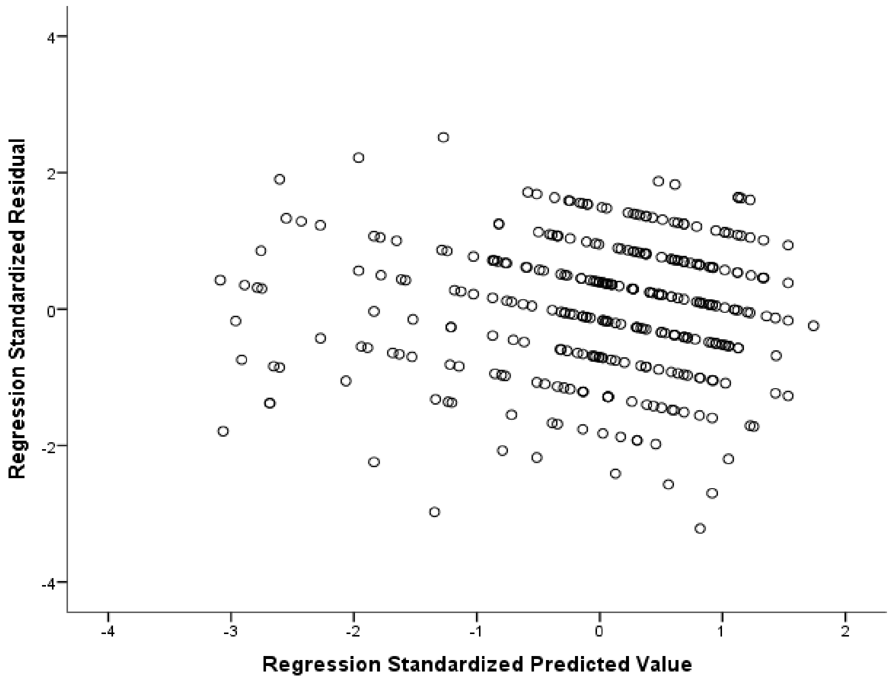

Figure S16d Scatter plot of standardized residual vs standardised predicted value (Spatial Recognition Memory (SRM)).

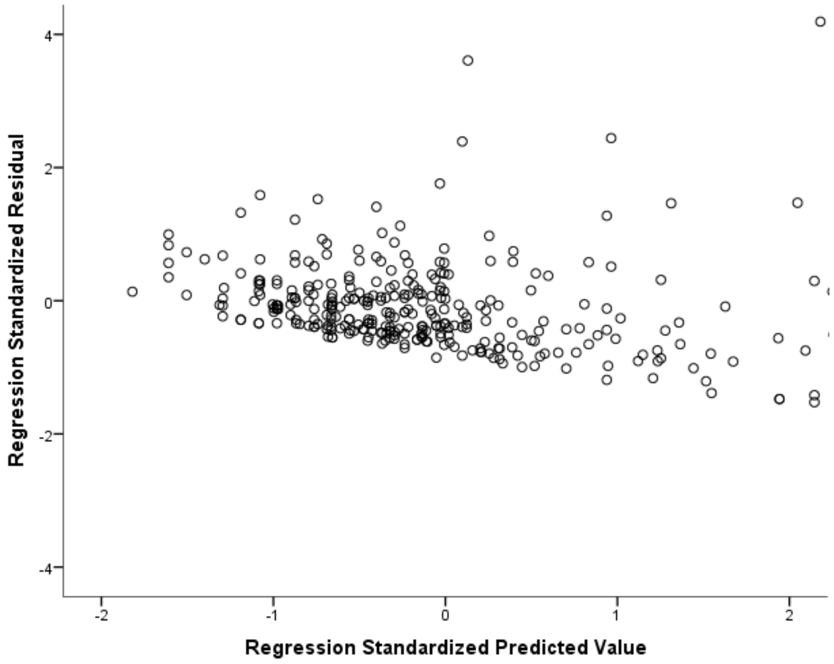

Figure S16e Scatter plot of standardized residual vs standardised predicted value (Paired Associates Learning (PAL)).

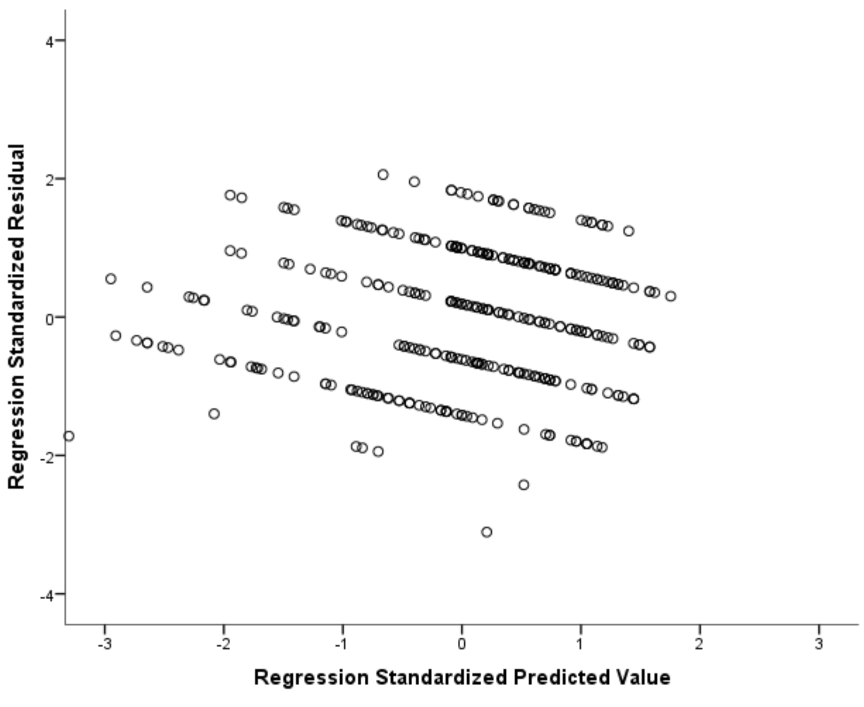

Figure S16f Scatter plot of standardized residual vs standardised predicted value (Spatial Span (SSP)).

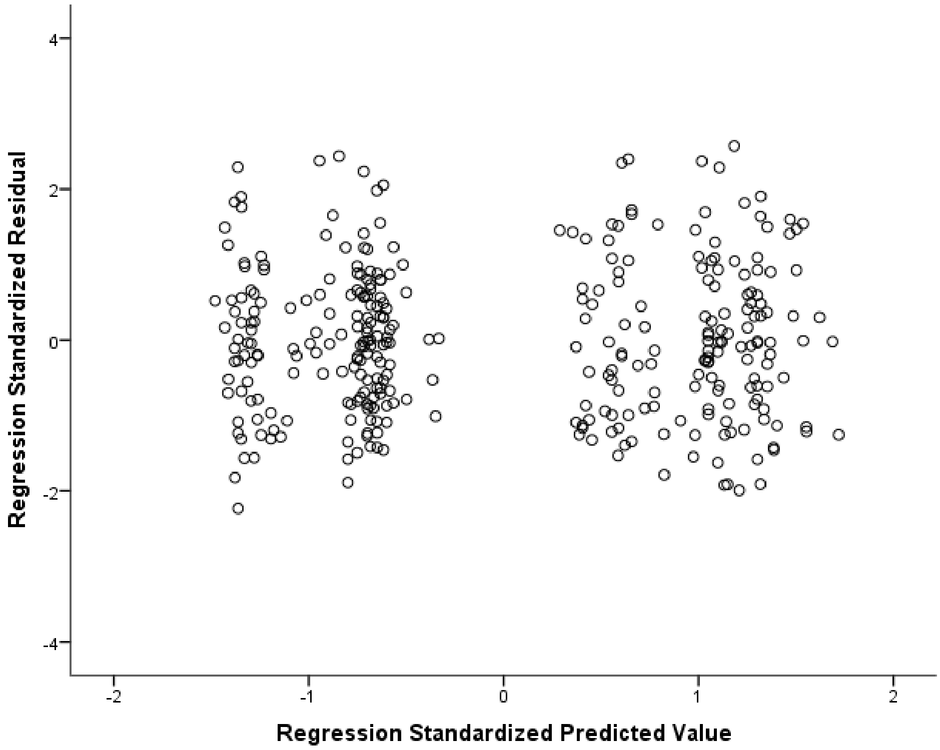

Figure S16g Scatter plot of standardized residual vs standardised predicted value (Motor Screening Task (MOT)).