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Supplemental Material

Rheumatoid Arthritis in Agricultural Health Study Spouses: Associations with Pesticides and Other Farm Exposures

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Reference

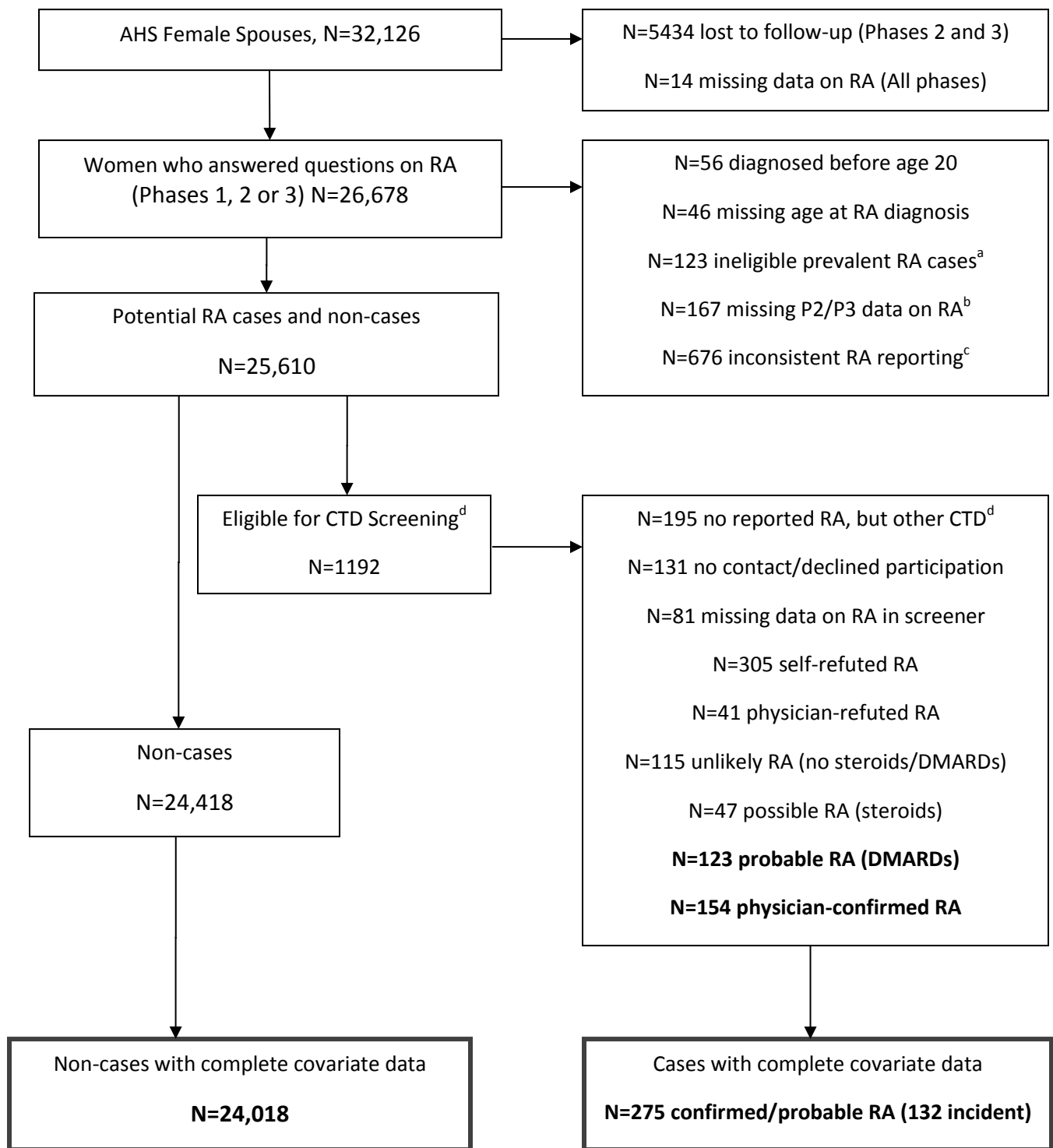


Figure S1. Identification of RA cases and non-cases

^aPrevalent cases not included in prior study (DeRoos AJ et al., 2005)

^bWomen who completed AHS follow-up questionnaires, but did not provide responses on RA status

^cInitial self-report not confirmed by in subsequent AHS questionnaires

^eEligibility based on inclusion in prior study (mostly prevalent RA; De Roos AJ et al., 2005) and all new incident RA cases (total N=795), and those with related connective tissue diseases (CTD; systemic lupus erythematosus and Sjögren's syndrome – SLE and SS)

Table S1. Characteristics of physician confirmed and probable RA cases

included in analyses, and other self-reported RA cases excluded from analyses

	Confirmed/probable RA				Self-reported RA, excluded ^a					
	Physician Confirmed N=154		DMARD use/ Probable N=123		Steroid use/ Possible N=47		No DMARD or steroid use N=115		Physician Refuted N=41	
	N	%	N	%	N	%	N	%	N	%
Age (years)										
<40	20	13	15	12	4	8	22	19	3	7
40-49	33	21	33	27	8	17	24	21	11	27
50-59	57	37	50	41	21	45	39	34	18	44
60+	44	29	25	20	14	30	30	26	9	22
State										
NC	48	31	57	46	26	55	44	38	12	29
IA	106	69	66	54	21	45	71	62	29	71
Diagnosis age										
16 to 42	59	38	32	26	10	24	38	34	20	50
43 to 51	34	22	30	25	15	35	33	30	8	20
52 to 59	32	21	28	23	7	17	23	21	5	13
60 to 82	29	19	32	26	10	24	17	15	7	18
Missing	0	--	1	--	5	--	4	--	1	--
Diagnosis year ^b										
Before 1990	69	45	32	26	16	38	42	38	16	40
1990 to 1999	68	44	38	31	16	38	49	44	22	50
2000 and later	17	11	52	43	10	24	20	18	4	10
Missing	0	--	1	--	5	--	4	--	1	--
Rheumatologist ^c										
Never Seen	13	10	11	9	21	46	57	71	19	66
Seen By	9	7	16	13	3	7	7	9	4	14
Diagnosed By	106	83	94	78	22	48	16	20	6	21
Don't know	2	--	2	--	1	--	2	--	0	--
Joint symptoms 6+ weeks ^c										
No	12	8	14	13	10	21	15	23	1	3
Yes	139	92	98	87	37	79	51	77	30	97
RF test ^c										
Not tested	6	5	14	15	20	51	28	43	12	39
Tested negative	9	8	6	6	1	3	2	3	1	3
Tested positive	90	81	70	75	16	41	20	46	12	39
Don't know result	6	5	3	3	2	5	7	10	3	10
Don't know if tested	18	--	19	--	9	--	9	--	3	--

^aTotal of 784 were screened (784 were screened for RA plus 7 were screened for another CTD and reported RA for the first time on the screener); of those screened, 305 refuted their diagnosis. Of categories shown, unconfirmed = reported no DMARD or steroid use, possible = reported steroid use for RA, probable = reported DMARD use for RA; physician-refuted and confirmed cases were identified based on a subset with validation data.

^bDiagnosis year could not be calculated for those who reported an age-range of diagnosis.

^cQuestions not administered to 29 women who completed a mailed screener (13 self-refuted, 5 unconfirmed and 11 probable cases). Due to changes in the screening protocol, others were not asked about seeing a rheumatologist (33 unconfirmed, 25 physician confirmed, and 12 physicians refuted). RF and symptom data were not collected from many, but not all of these same cases (not asked: 49 unconfirmed, 10 probable, 3 confirmed and 12 refuted by physician).

Table S2. Risk of incident RA associated with recent farm exposures, stratified by childhood farm residence

	No childhood farm			Yes childhood farm		
	Comparison	Case	OR95%CI ^a	Comparison	Case	OR95%CI ^a
	N=9202	N=47		N=14,197	N=80	
	%	%	%	%		
Lifetime use of pesticides						
None reported	39	34	1.0 (referent)	29	24	1.0 (referent)
Not specified	15	4	NC (---)	12	15	1.6 (0.81, 1.3)
Any specified	47	62	1.5 (0.80, 2.8)	58	61	1.4 (0.86, 1.8)
Glyphosate	31	46	1.9 (1.1, 3.4)	38	41	1.2 (0.73, 1.4)
Carbaryl	26	32	1.3 (0.69, 2.4)	36	34	0.86 (0.71, 1.3)
Malathion	16	15	0.90 (0.40, 2.0)	23	21	0.96 (0.67, 1.4)
2, 4-D	11	11	0.92 (0.36, 2.4)	18	12	0.60 (0.29, 1.2)
Diazinon	9	9	NC (---)	12	15	1.3 (0.64, 2.3)
DDT	2	2	NC (---)	5	12	2.0 (1.0, 4.2) [#]
Maneb	1	2	NC (---)	2	8	3.7 (1.6, 8.8)
Current growing season, Field work						
None	55	60	1.0 (referent)	43	53	1.0 (referent)
Less than 10 days	20	17	0.81 (0.37, 1.9)	21	17	0.79 (0.43, 1.4)
10–30 days	15	13	0.80 (0.33, 1.9)	20	21	0.93 (0.53, 1.6)
More than 30 days	10	11	1.0 (0.35, 2.6)	16	9	0.45 (0.20, 1.1)
Specific tasks						
Till the soil	19	20	1.1 (0.52, 2.3)	28	22	0.76 (0.44, 1.3)
Planting	20	26	1.3 (0.65, 2.6)	26	34	1.3 (0.80, 2.1)
Use natural fertilizer	9	9	NC (---)	13	10	0.71 (0.34, 1.5)
Use chemical fertilizer	9	16	1.8 (0.78, 4.1)	12	19	1.5 (0.85, 2.7)
Drive combined	9	9	NC (---)	13	8	0.64 (0.27, 1.5)
Hand-pick crops	23	31	1.5 (0.78, 2.9)	27	29	0.97 (0.58, 1.6)
Other regular tasks past 12 months						
Drive trucks	37	28	0.67 (0.34, 1.3)	41	39	1.0 (0.65, 1.6)

Use a diesel tractor	27	29	1.2 (0.61, 2.2)	38	26	0.63 (0.37, 1.1)
Use a gas tractor	20	27	1.5 (0.79, 3.0)	30	26	0.84 (0.50, 1.4)
Clean with gas	11	9	NC (---)	18	18	1.1 (0.62, 2.0)
Clean with solvents	17	23	1.5 (0.70, 2.9)	22	30	1.7 (1.0, 2.8)
Painting	29	30	1.1 (0.55, 2.1)	34	41	1.5 (0.96, 2.4)
Veterinary procedures	10	10	NC (---)	15	12	0.98 (0.48, 2.0)
Hours per day in the sun, recent growing season						
< 1	30	26	1.0 (referent)	25	31	1.0 (referent)
1 to 2	34	37	1.3 (0.61, 2.9)	32	40	1.1 (0.60, 1.9)
3 to 5	27	26	1.2 (0.51, 2.8)	30	23	0.68 (0.35, 1.3)
6+	10	12	1.5 (0.51, 4.3)	14	6	0.41 (0.14, 1.2)
Hours per day in the sun, 10 years ago						
< 1	21	15	1.0 (referent)	16	14	1.0 (referent)
1 to 2	28	22	1.2 (0.42, 3.3)	25	31	1.4 (0.64, 3.1)
3 to 5	33	48	2.1 (0.84, 5.4)	36	39	1.3 (0.58, 2.7)
6+	17	15	1.3 (0.41, 4.0)	23	15	0.70 (0.29, 1.8)
Livestock contact past year						
Never	52	53	1.0 (referent)	43	54	1.0 (referent)
< 1X/week	29	26	0.96 (0.48, 2.0)	29	29	1.0 (0.53, 1.7)
≥1X per week	19	21	1.2 (0.56, 2.6)	28	17	0.67 (0.34, 1.3)
Livestock contact, childhood						
Never	59	71	1.0 (referent)	6	4	1.0 (referent)
< 1X/week	24	21	0.78 (0.35, 1.7)	8	6	NC (---)
≥1X per week	17	8	NC (---)	86	90	NC (---)

#P<0.05

^aOdds Ratio (OR) and 95% Confidence Interval (CI) adjusted for age, smoking pack years

Table S3. Risk of RA associated with specific pesticides, stratified by state

	North Carolina			Iowa		
	Comparison	Case	OR(95%CI) ^a	Comparison	Case	OR(95%CI) ^a
	N=6,929	N=46		N=17,089	N=86	
	%	%	%	%		
Lifetime pesticide use						
None	43	27	1.0 (referent)	29	28	1.0 (referent)
Not specified	10	5	0.7 (0.15, 3.1)	14	15	1.1 (0.54, 2.1)
Any specified	46	68	2.4 (1.2, 4.7)	56	56	0.99 (0.61, 1.6)
Glyphosate	29	40	1.7 (0.91, 3.1)	37	44	1.3 (0.86, 2.0)
Carbaryl	34	44	1.5 (0.82, 2.7)	31	27	0.74 (0.46, 1.2)
Malathion	17	21	1.3 (0.61, 2.7)	21	17	0.70 (0.39, 1.2)
Diazinon	13	22	2.0 (0.93, 4.1)	9	7	0.71 (0.31, 1.6)
2, 4 D	6	0	NC (---)	19	17	0.81 (0.46, 1.4)
Chlordane	3	1	NC (---)	5	6	1.1 (0.45, 2.8)
Permethrin (animals)	2	5	NC (---)	5	6	1.4 (0.58, 3.6)
DDT	4	17	4.7 (2.0, 10.8)	1	4	NC

^aOdds Ratio (OR) and 95% Confidence Interval (CI) adjusted for age, smoking pack years.

REFERENCE

De Roos AJ, Cooper GS, Alavanja MC, et al. Rheumatoid arthritis among women in the Agricultural Health Study: risk associated with farming activities and exposures. *Ann Epidemiol.* 2005 Nov;**15**:762-70.