

Presentation 3 – Han Kang

**A Review of Medical Records for 206
Children with Birth Defects Reported
by Gulf War Era Veteran Parents**

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Background

The National Health Survey of Gulf War Era Veterans and Their Families,
Phase I & II, 1995-1996*

Unit Component	Male	Female	Total
Active	4,800	1,200	6,000
Reserve	4,000	1,000	5,000
National Guard	3,200	800	4,000
Total	12,000	3,000	15,000

* Kang et al, JOEM 2000; 421:491-501

SURVEY DESIGN

- Questionnaires through the mail
- Supplemental telephone interviews
- Physical examinations on a sample of veterans
- Validation through civilian, military and VA medical records

QUESTIONNAIRE INSTRUMENTS

- Limitations of activities
- Use of medical services (hospitalization, clinic visit)
- Chronic medical conditions (31 items)
- Prevalence of symptoms (48 items)
- Exposures in the Gulf theater (24 items)
- Prophylactics, vaccines (9 items)
- Reproductive health and pregnancy outcomes
 - live birth
 - birth defects
 - infant death
 - still birth
 - miscarriage
- Life events (14 items)
- Smoking & drinking histories
- PTSD checklist (PCL), 17 items

Percent Distribution of Selected Characteristics of Those Who Responded vs. Those Who Have Not Responded

Characteristics	Phase I	Phase II	Non Respondents
	Respondents (N=15,817)	Respondents (N=5,100)	Respondents (N=9,083)
Sex			
Male	79.3	81.8	80.3
Female	20.7	18.2	19.7
Age (Mean Age in 1991) Years	31.6	29.2	27.7
Race			
White	76.0	69.2	57.4
Black	16.4	24.2	32.8
Other	7.6	6.6	9.8
Marital Status			
Married	55.2	50.3	42.4
Single	39.4	44.7	53.5
Other	5.4	5.0	4.1
Rank			
Enlisted	82.6	88.0	92.4
Officer	15.8	11.0	7.0
Warrant	1.5	1.0	0.6

Percent Distribution of Selected Characteristics of Those Who Responded vs. Those Who Have Not Responded (cont'd)

Characteristics	Phase I	Phase II	Non Respondents
	Respondents (N=15,817)	Respondents (N=5,100)	Respondents (N=9,083)
Branch			
Air Force	12.9	12.8	8.0
Army	63.8	61.7	65.7
Marine	10.6	12.3	11.7
Navy	12.7	13.2	14.0
Unit Component			
Active	38.1	40.3	43.2
National Guard	27.8	26.7	24.7
Reserve	34.1	33.0	32.1
Current Active Duty			
Yes	20.3	16.2
No	79.7	83.8

Percent Distribution of Selected Characteristics of Those Who Responded vs. Those Who Have Not Responded by Gulf War Service Status

Characteristics	Gulf Veterans		Non-Gulf Veteran	
	Respondents (N=11,441)	Non-R † (N=3,459)	Respondents (N=9,476)	Non-R † (N=6,524)
Sex				
Male	81.4	80.0	75.1	80.5
Female	18.6	20.0	24.9	19.5
Age (Mean Age in 1991) Years	30.4	27.4	31.7	27.9
Race				
White	73.7	55.7	75.1	58.7
Black	19.0	34.1	17.4	31.8
Other	7.3	10.2	7.5	9.5
Marital Status ‡				
Married	52.5	42.9	55.8	42.1
Single	42.2	52.9	33.9	55.9
Other	5.3	4.2	5.3	4.0
Rank				
Enlisted	86.3	93.3	81.0	91.8
Officer	12.4	6.1	17.4	7.6
Warrant	1.3	0.6	1.6	0.6

Percent Distribution of Selected Characteristics of Those Who Responded vs. Those Who Have Not Responded by Gulf War Service Status (cont'd)

Characteristics	Gulf Veterans		Non-Gulf Veteran	
	Respondents (N=11,441)	Non-R † (N=3,459)	Respondents (N=9,476)	Non-R † (N=6,524)
Branch				
Air Force	12.5	8.4	13.4	8.7
Army	63.2	63.7	63.4	67.2
Marine	11.2	12.2	10.8	11.4
Navy	13.1	15.8	12.4	12.6
Unit Component				
Active	37.3	46.7	40.2	40.8
National Guard	28.3	23.3	26.5	25.7
Reserve	34.4	30.1	33.2	33.5
Current Active Duty				
Yes	19.2	19.4

† Non R= non-respondents
‡ Marital Status at the time of deployment

National Health Survey Phase I and II
Publications

- * Kang HK, Mahan CM, Lee KY, Magee CA, Murphy FM. Illness among United States veterans of the Gulf War, a population based survey of 30,000 veterans. *J Occup Environ Med* 2000; 42:491-501.
- * Kang HK, Magee C, Mahan CM, Lee KY, Murphy FM, et al. Pregnancy outcomes among US Gulf War veterans: a population based survey of 30,000 veterans. *Ann Epidemiology* 2001; 11: 504-511
- * Kang HK, Mahan CM, Lee KY, Murphy FM, et al. Evidence for a deployment related Gulf War syndrome by factor analysis. *Archives Environmental Health* 2002; 57:61-68
- * Kang HK, Natelson BH, Mahan CM, Lee KY and Murphy FM. Post-traumatic stress disorder and chronic fatigue syndrome-like illness among Gulf War veterans: A population based survey of 30,000 veterans. *Am J Epidemiol* 2003; 157:141-148 .
- * Mahan CM, Kang HK, Dalager NA, et al. Anthrax vaccination and self-reported symptoms functional status, and medical conditions in the National Health Survey of Gulf War Era Veterans and Their Families. *Ann Epidemiol* 2003; 13:1-8
- * Kang HK, Dalager NA, Ishii EK, et al. The role of sexual harassment and assault in PTSD among Gulf War veterans, manuscript submitted, under revision.

Table 1: Reported birth defects among index liveborn infants by Gulf deployment and gender of veterans

Birth Defects	Gulf (N= 2707)		Non-Gulf (N= 2266)		Adjusted OR(95%CI)
	N	(%)	N	(%)	
Likely defects					
Male	120	(5.4)	47	(2.8)	1.94(1.37-2.74)
Female	26	(5.5)	13	(2.3)	2.97(1.47-5.99)

Kang et al, *Ann Epidemiol* 2001; 11: 504-511

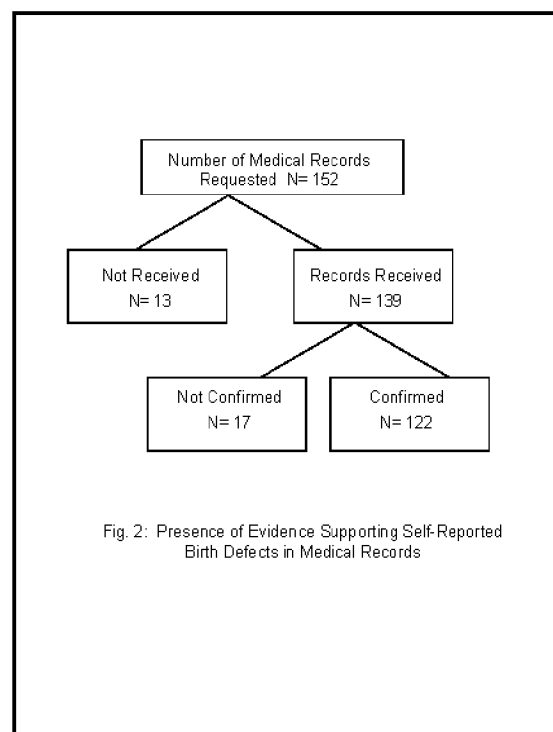
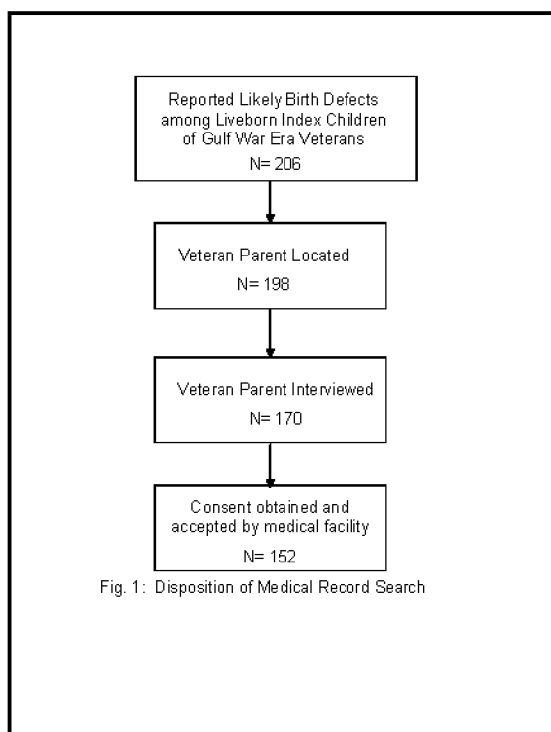


Table 2: Disposition of medical record review by parent Gulf War deployment status

Disposition	Gulf (N= 146)		Non-Gulf (N= 60)	
	N	%	N	%
Veteran Interviewed	126	86	44	73
Veteran Consented	112	(89)	40	(91)
Record Received	102	(91)	37	(93)
Male	83		25	
Female	19		12	
Self-Report Confirmed	87	(85)	35	(95)
Male	71		24	
Female	16		11	

Table 3: Confirmation rate by groups of birth defects and parental Gulf War deployment status

Group of Birth Defects	Gulf		Non-Gulf	
	# Records	# Conf	# Records	# Conf
1. Chromosomal Abnormality	5	5	0	0
2. Multiple Anomalies (Except Chromosomal & Heritable Genetic)	7	7	9	9
3. Isolated Anomaly	75	63	24	23
4. Congenital Malignancy	1	1	0	0
5. Heritable Genetic Disease	2	2	0	0
6. Undescribed Isolated Heart Abnormality	8	6	2	1
7. Other Poorly Described Defect (on-Cardiac)	4	3	2	2
Total	102	87	37	35

Table 4. Adjusted relative risk estimates for likely birth defects

Gender	Adjusted relative risk(95% confidence interval)			
	Phase I & II	Green's method ^{a)}	Direct ^{b)}	Confirmed Cases ^{c)}
Male veterans	1.98 (1.39-2.83)	2.78	1.72(1.21-2.43)	2.24(1.41-3.55)
Female veterans	2.53 (1.23-5.27)	2.71	2.28(1.12-4.56)	1.78(0.88-3.84)

^{a)} True risk ratio = $(P^1/P^2 - (1 - Pr^1d_1)/Pr^1d_1)$, where Pr^1d_1 denotes the positive predictive value within the non-Gulf veteran group, as defined by Green; Kelsey, JL et al. 1986

^{b)} dRR = (self-report cases Gulf / # live birth Gulf) x confirmation rate Gulf + (self-report cases non-Gulf / # live birth non-Gulf) x confirmation rate non-Gulf

^{c)} cRR = (confirmed cases Gulf / # live birth Gulf) + (Confirmed cases non-Gulf / # live birth non-Gulf)

Summary

- Among those veterans who were located, and who consented to release their medical records, reported birth defects were documented in medical records for 85% of Gulf War veterans' children and 95% of non-Gulf veterans' children.
- The association of the reported birth defects among children and veteran's military service in the Gulf War was supported by a review of medical records.