# A Post-Conflict Assessment of Breast Cancer in Kuwait Using Mixed Methods

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## Abstract

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The Gulf War oil well fires lasted over eight months in 1991. The subsequent environmental degradation has had real, yet poorly documented impacts, on Kuwait health. The chemical fallout from the war makes it a unique case study of conflict, environmental degradation and health. The life course approach serves as the conceptual basis for this dissertation. By developing a modified ethnographic approach suitable for Kuwait, I was able to collect and procure qualitative and quantitative data in a site-specific, systematic manner.

From the cancer registry data, we notice a “shift” in breast cancer rates which began around 1999. Leukemia and thyroid cancers are also increasing more rapidly

than in other Arab countries not affected by the war. From the clinical case-control study, we identified an association between stress and the appearance of breast cancer in Kuwaiti women. Also, women who self-identified as trauma victims were more likely to have breast cancer than healthy women.

From the qualitative study, we learn about the environmental health community's concerns around breast cancer. One woman stated that "it's like the flu…every family has it." Since the late 1990s breast cancer has become a common occurrence in Kuwaiti households. Many of the participants felt that their voices had not been heard by the government. In fact, they felt that the government was actively trying to downplay the role of the residual Gulf War pollution on the development of cancer in Kuwait. It is suggested that the government carry out further monitoring and surveillance of leukemia and breast cancer in Kuwait in addition to executing a full clean-up of the Kuwaiti desert.

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## DEDICATION

I wish to dedicate this project to my grandfather William J. Rieger who passed away earlier this year. He was a naturally curious person always asking “why,” the most important question in research.

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## FOREWORD

This dissertation is composed of several studies on the health consequences of the Gulf War. In these pages I have woven together an interdisciplinary, public health-focused approach based on two years of ethnographic fieldwork in Kuwait in 2007 and 2011 as well as thorough subsequent quantitative analysis and qualitative analysis from documenting registries, newspapers and various archives in Kuwait, diverse online news sources and from the University of Washington libraries.

I became interested in Gulf War exposures and illness while investigating the reported health anomalies of French Gulf War veterans in Paris. Similarly, Gulf War Syndrome has reached epidemic proportions among American veterans returning from duty in the Persian Gulf Region, both after the 1991 and the 2003 invasions of Iraq. Vietnam veterans (25%) felt that if the government let soldiers and civilians *be exposed* to toxins during armed conflict, then their civil and bioethical rights were violated (Roberts 1988). Consequently, I decided to go on the ground to explore how veterans were exposed. In the process, I quickly deduced from my everyday conversations, as described in the following sections, that local civilians were also suffering from similar conditions. In the case of Kuwait, Harvard School of Public Health has determined that mortality has slightly increased as a result of the war and oil

well fires (HSPH 2005). Overall mortality has increased by at least 3%[1] in relation to pre-war levels where mortality rates were, in fact, decreasing (MOI 2006). With approximately sixty percent of the country's landmass covered in petrol or petrol residues, clearly Gulf War exposures have been massive and persistent (KSIR 2003).

[1]Figure adjusted for sex; it is a conservative estimate

# INTRODUCTION

The following chapters present an applied study on effects of the 1990-1991 Gulf War related to breast cancer rates in Kuwait. As a post-conflict assessment with multiple types of methods, the study seeks to respond to several interdisciplinary research questions. **The aim of this project is to conduct a robust post-conflict health assessment of adverse health conditions in Kuwait with a specific focus on breast cancer.**

In the first chapter I give a summary of the main events that led up to the Gulf War, as well as the environmental consequences of the war. In particular, I am interested in the massive release of soot from the oil well fires that lasted over 8 months in 1991.

Chapter 2 provides the context for the war, the environmental degradation and its poorly documented, yet real, impacts on Kuwait health. The rapid militarization of Iraq during the 1980s was a major instigator for the war. The chemical fallout from the war makes it a unique case study of conflict, environmental degradation and health. In particular, the Gulf War oil fires represent the largest unique release of polycyclic aromatic hydrocarbons (PAHs) and 100s of tons of depleted uranium (DU), a waste product of the uranium enrichment process which is a known carcinogen and possible endocrine disruptor.

Chapter 3 introduces the reader to the project's conceptual basis by citing and defining the life course approach. This approach has come a long way since the first birth cohort studies by Emmy Wenner on Maui in the 1960s. Here I

present an innovative life course approach designed to consider how war impacts child development, life trajectories and adverse health outcomes.

Chapter 4 drafts a methodological framework for fieldwork in Kuwait. In particular, this chapter highlights a modified ethnographic approach suitable for an Arab Gulf context such as Kuwait. Relying on other Middle East scholars Soheir Morsy, Arzoo Asanloo and Lila Abu-Lughod, this text sets the groundwork for collecting and analyzing qualitative data in a site-specific, systematic manner. The methodological framework evolved from preliminary fieldwork in 2007 in Kuwait, albeit with great difficulty and perseverence, while proving immensely useful and character-forming. I also returned to Kuwait in 2011 for an additional year. These periods of intensive, on-the-ground research, as described throughout Chapter 4, enabled me to procure data for all the empirical chapters—making it a chapter integral to the underpinnings of the entire dissertation.

Chapters 5 and 6 explore more quantitative, some would argue perhaps more conventional, aspects of a post-conflict health investigation. These chapters also provide a rare glimpse into the "counts" of who has fallen ill in contemporary Kuwait as they are often the forgotten victims of the Gulf War. Chapter 5 is an ecology study that compares cancer rates in Jordan and Oman to rates in Kuwait since 1992. This study will compare breast cancer rates, the rates for other cancers, and heart attack rates in Kuwait with these same rates in

Jordan and Oman--which serve as a control sites—given those culturally-similar countries were not exposed to wartime-related pollutants.

Chapter 6 presents a cross-sectional Quality of Life survey that measures physical and mental health status, as well as other health and lifestyle measures. This survey (N=589) took place in Kuwaiti clinics and compared health among three cohorts of women. The survey emphasized mental health concerns, residual trauma, alienation (*Owzla*) and other issues in employing several quantitative scales and qualitative, open-ended questions.

Chapter 7 proposes a qualitative study of the views on the effects of the Gulf War on the environment, physical and mental health issues pertinent to environmental and health experts in Kuwait. This particular study uses an ethnographic approach to interviewing and relies on Explanatory Models and other participant-focused methods. The interviews will be analyzed for themes and the main themes will be presented in the final conclusions.

All three empirical chapters will be synthesized in Chapter 8. Chapters 5, 6, and 7 each has a different level of population (national, clinic, individual) and is using different methods to ascertain the answer to the relevant research questions. In sum, a mixed-methods approach was employed to achieve study goals (Jick 1979).

Here I would like to define armed conflict as we will be discussing this concept throughout the present work. Armed conflicts share several similar

characteristics: involve state boundaries; come with political origins[2]; spur social cleavages; and either cause or lead to predatory social dynamics (Goodman 1999). As with any social transformation, social power, control, and resistance, as well as societal norms (i.e. contextual factors), are reformulated in relation to the existing order, determining how well society functions after the armed conflict (Henry 2006; Morsy 1990, 1993, Morgan 1987).

[2]In the case of the Gulf War, this refers to the continued border issues between Iraq and Kuwait since the 1960s, described in a later section.

## CHAPTER 1
## An Environmental Perspective on the 1990-1 Gulf War Crisis and Its Aftermath

*The Kuwaiti, Victim of Iraqi Invasion*

The Kuwaiti population may be viewed as the main victim of Iraq's militarized period of the 1980s—when Iraqis amassed lethal biological and chemical weapons. This militarization directly (e.g. torture) and indirectly (e.g. toxic exposures) harmed Kuwaiti health by exposing the population to collective stress and residual chemical aerosols during and immediately after the war. Indeed, the violent social transformation of the Gulf War became somaticized as an expression of fear and vulnerability in the Kuwaiti population (Henry 2006). As this fear was internalized, it negatively affected certain biological mechanisms that cause ill health (Helman 2000; Lock & Scheper-Hughes 1990). The Kuwaiti body is the focus of my later public health inquiry into the long-term effects of collective trauma on cancer incidence (Helman 2000; Cange 2007).

The issues of bodily and psychological wartime trauma will be treated in greater detail in Chapter 3. In this chapter I present an environment-oriented history of the Gulf War. This history suggests the antecedents of the Gulf War are threefold: oil field disputes, debts from the Iran-Iraq War and the ongoing non-recognition of Kuwait's sovereignty by Iraq. Also the hypermilitarization of Iraq, possessing a deep arsenal of weapons and weapons-making materials, deeply concerned US national and foreign security officials.

During war, rampant insecurity provokes severe mental health consequences (Abramowitz 2005, Casey 2007). Aside from the immediate,

tangible casualties, maimings, and psychological trauma and other related illnesses, armed conflict often leaves behind clusters of physical, chronic diseases. After the 1991 Persian Gulf War, many Kuwaitis insist that new illnesses have emerged. The Gulf War was one of the first modern wars that was broadcast widely, and, at the same time, included the simutaneous use of chemical, biological, radioactive weapons as well as night goggles and SCUD missiles (Hoskins 1997). Having received little coverage in the Western media or in academic presses, Kuwaitis' health fears and potential links to weapons exposures were only recently confirmed (HSPH 2005, Gerstein 2009). Kuwait serves as a unique case study because of its geographic proximity to Iraq and its relative political and economic stability, and because the passage of time has made Kuwait a prime laboratory for exploring the long-term consequences of modern weapons on population health. The *aim of this project* is to conduct a robust post-conflict health assessment of adverse Kuwaiti health with a focus specifically on breast cancer.

The largest environmental and health impact of the short Gulf War came when Saddam Hussein's forces set nearly all of Kuwait's oil wells ablaze, leading to one of the world's largest environmental catastrophes (Bloom 1994). Indeed, TIME magazine cited these fires in 2010 as the third most significant environmental disaster of all time, after the Chernobyl and Bhopal accidents and their respective aftermaths (Time 2010). This environmental disaster has deep historical roots that I hope to explicate in the following section. Kuwait's colonial past greatly buttressed the expanding regional petroleum-reliant relations; it is

necessary to partially revisit this legacy in order to grapple with the nation's recent and increasingly worse population health.

**The post-colonial period revisited, briefly: One step west, the other eastward**

The sway of colonial powers' influence in the Middle East is still palpable in everyday life. The current occupation and insurgencies in Iraq and Palestine stoke passionate arguments among Kuwaitis against U.S. foreign policy (Cange 2009, Aware 2011, Tetreault 2001). Kuwait, as a self-proclaimed *rapidly developing nation,* finds itself with one foot in the West--economically, financially and in terms of its consumerist lifestyle--and the other dangling over the Persian Gulf, cemented in Arab traditions and religion, namely Islam. It is viewed by the US as an oasis for military installations and a staunch ally of the US government, and if not before 1990, certainly afterwards (Brown 2004). However, in my conversations with average Kuwaitis, many expressed frustration, if not contempt, for American Middle East policies as harbingers of global imperialism or perhaps a veiled attempt at re-colonizing the Arab nation.[3] Kuwaiti nationalism has grown exponentially since the final days of the Gulf War (Cange 2009; Maksoud 1994, Tretault 2000).

Doyal, an anthropologist working in Latin America, observed that the West's imperialist legacy begets ill health in the developing world as evidenced

[3] I am referring to the League of Arab States comprised of 22 individual nations. It encourages pan-Arabism, despite the great disparities of wealth and culture among the states and unfulfilled promises to "help out the weaker states."

by the realpolitik of post-colonial development programs. Many so-called development projects (e.g. mining operations) are driven by the bottom line of multinational corporations and result in important disease sequelae over the life course for the local community (Doyal 1994).

The international military-industrial complex and the sales of arms offer an illuminating example of obtuse political structures that preclude healthy societies. These programs help nations who prioritize the budget of the defense ministry over the health ministry. Major parts of development aid budgets and in-kind support projects are reserved for militarization of the recipient country including procuring weapons, and, in some cases producing, trafficking and storing armament systems (Jambai 1996, Chanaa 2005). As Kuwait and Iraq were the recipients of such projects in the 1980s, what was the effect of large-scale weapons testing or weapons use during the Gulf War on the current well-being of the Kuwaiti population? know of innumerable instances where chemical weapon stores were exploded in the Persian Gulf. These instances will be explored in a later section.

**Oil, Iraq's Militarization, War and Aftermath**

Kuwait, as a small, wealthy nation, is rather vulnerable to outside forces, leaving its citizens with a sense of extreme geographic insecurity (Bloom 1994). To this extent, I will explore in this section how twin commodities, oil production and weapons procurement, radically shifted the regional power dynamics, and thus the Kuwait psyche during the 1980s.

Government-private enterprises were launched in Kuwait during the 1960s, leading to the construction and operation of many refineries with a stock of 1,000 oil wells in the 1970s (Hoskins 1997). By 1979, all of the major operating companies were under the complete control of the State of Kuwait, with massive profits padding the State treasury (Maksoud 1994). The emirate soon became known as an opulent stopping ground for exporting petrol, with Iraq and Iran increasingly jealous of its prime coastal port, due to the fact that Iraq, in particular, did not have such access for its own exports (Maksoud 1994). To date, Kuwait and Iraq are still in a dispute over Kuwait's proposed Boubyan Island port.

During the military build-up between Iraq and Iran in the early 1980s undertaken for sectarian and economic reasons, both sides made overtures toward Kuwait for military and financial support; some more dovish, others clearly hawkish. Kuwait begrudgingly took Iraq's Sunni-dominated side in this period (Bloom 1994) to appease its own majority Sunni population. It is well documented that Iraq and Kuwait have been engaged in a long-standing feud since the latter's founding in the 18$^{th}$ century (Longva 1997).

The Persian Gulf War should be seen as a tragic perfidy between two intimately vested business partners: Iraq, considered a prime enemy of the State under Bush I, had previously been the beneficiary of mass weapons deals from the US (Bloom et al. 1994). Why was the U.S. so determined to build up Iraq's arsenal? This business partnership was arranged by Donald Rumsfeld and the Bush family based on long-standing personal ties (Bencroft 1998). Yet Iraq,

believing that the region had been wrongly partitioned by the British, still considered Kuwait to be its 19th province, *Kadehema* (Maksoud 1994) and did not feel beholdent to the US despite its heavy military investiment.

The recent Gulf War can be traced back to squabbles over Kuwait's independence in 1961 when Iraq attempted to block Kuwait's admittance to the UN. In 1970 Iraq solicited control over the islands of Warbah and Bubiyan from Kuwait, thus giving Iraq greater control of its port area in the Gulf. In May 1973 Iraq had already made a partial attempt to invade Kuwait by occupying the border post of Samitah. Following a fleeting skirmish and peace deal spearheaded by the Arab League, Iraq later withdrew in 1974 (Maksoud 1994). Kuwait refused a similar request for port access in 1980 and 1989. Iraq considered these decisions unfriendly and caused growing tension between the two nations. Later Iraq claimed that Kuwait pumped out over $10 billion dollars worth of oil from the Rumathiya field, oil normally destined for Iraqi export.

The third issue emerged from the enormous debt that Iraq accrued in the aftermath of the Iran-Iraq war. Hussein believed that other Gulf nations should be grateful for his country's efforts to thwart the spread of Khomeini's Islamic revolution. Iraq was wallowing in debts exceeding $80 billion—about one and half times its gross national product—including $30 billion in short-term debt due to Europe, Japan and the US. Roughly half of this debt was owed to Saudi Arabia, Kuwait and the UAE. In February and July 1990, Iraq inquired about

receiving more liquidity from these Arab states. However, its requests were turned down in both instances (Longva 1999)

During the 1980s, the US and the UK were tacitly supportive of Saddam Hussein; they had gone so far as to prevent any UN reaction to Iraq's attack on Iran. At the time, Iraq was a Soviet client, but Reagan, Thatcher and Bush recognized Saddam Hussein as "their kind of guy" and moved to change their positions toward his regime; within a few years, Iraq was largely Western–oriented (Clark 1992). Iraq was subsequently removed from the list of states that sponsor terrorism, allowing it to receive substantial credits from the US and become a major trading partner, exporting Iraqi oil to the US and receiving US agricultural loans and other exports as described in the next section.

Western corporations took an active role in reinforcing Iraq's military strength, including its weapons of mass destruction. The Reagan and Bush administrations intervened militarily to prevent Congressional censure of the Iraqi regime's egregious human rights record. Such a censure or resulting sanctions might have interfered with profits for US corporations or with Iraq's growing strength (Clark 1993). In July 1990, the State Department indicated to Saddam Hussein that it had no serious objection to his intentions to rectify border disputes with Kuwait, or intimidating other oil producers to raise the price of oil to $25/barrel. There was not any doubt that he was a murderous gangster, but as Ramsey Clark admits, he was "our gangster" (idem).[4]

[4] Unlike Bush or Reagan, the Western peace movement and Iraqi democratic opposition had always opposed Saddam Hussein, but also opposed the quick resort to violence to undercut the danger that sanctions and

In July 1990, Iraq summoned the US Ambassador to a Baghdad meeting to inquire about a possible US intervention if Iraq invaded its southern neighbor (Bloom 1994). American Ambassador April Gillespie[5] is largely believed to have given the green light to the Iraqis by asserting that "the US has no role in settling Arab-Arab disputes" (Clark 1992, Bloom 1994). In my fieldwork, many Kuwaitis referenced this conversation as justification for Hussein's invasion:

> At the MS Support Group one frigid January evening, I sat side-by-side on folding chairs at the Red Crescent multipurpose room, with Abdullah, a portly mid-aged Kuwait, dressed in a sand-colored *dishdasha* who wagged his finger at me: "She let Saddam come down here. She told him to invade. And you guys used uranium that's why we're all sick. How else could you explain all this?" peering over to his friends and associates, young and stricken with MS. "You Americans helped Saddam get all those weapons. You helped him during the Iran War, get weapons of mass destruction, anthrax, all that stuff."

And, indeed, Abdullah was referring to the Banco Nationale Lavore scandal.

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diplomacy would lead to a peaceful resolution of the conflict. Such an outcome would have perhaps thwarted the war.

[5] She was one of the first female American ambassadors assigned to the Middle East. Western women, however, are no strangers to diplomatic postings in the Middle East. In the early 20th century, Gertrude Bell, a British national, was the main negotiator in establishing the modern-day Iraqi borders (Howell 2007). Nonetheless, Gillespie was not revered, and her reputation has since been one of an enabler for Hussein's subsequent invasion (Howell 2007).

**The BNL Scandal, Reagan's Second Iran-Contra**

In a little-known, but politically and financially costly, scandal, the US government was caught colluding with the Banco Nationale Lavoro (BNL), a powerful Italian bank, to funnel 5.5 billion dollars to Iraq over 7 years (1984-1991) under the guise of USDA agricultural revolving loans.[6] When the US Congress finally caught wind of the scheme, it was too late: the president, the USDA, the Treasury, and the Department of Justice-- representing the power elite –were all implicated in the debacle (Bloom 1994; Morgan 1987). In effect the US supplied Iraq with weapons and aid monies through these so-called "agricultural loans,"[7] as well as weapon sales clandestinely carried out with Iran that would later fund the Nicaraguan Contras. For example, in the late 1980s, the Iraqis launched the Project SAAD 16, a missile research, development and testing center outside the northern Iraqi city of Mosul (Maksoud, 1994). Its new missiles had a longer range, up to 1,000 kilometers.

Even Kuwait loaned large sums to Iraq to maintain its battle against its archenemy, Shia-dominated Iran. However, once the former Babylon annexed Kuwait as part of the Gulf War, the US no longer wished to support the Iraqi regime (Hoskins 1994).

Meanwhile, by 1990 Iraq had amassed a trundle of potent and noxious military armor including a cluster bomb factory, capable of annihilating millions of

[6] A revolving loan fund (RLF) is a gap financing measure primarily used for development and expansion of small businesses

[7] The Iran-Contra Scandal exposed how the Reagan administration was using sales from weapons trafficking to Iran during the Iraq-Iran War to support the Sardinistas in Guatemala. More simply put, we were supporting both sides.

people. In 1995, UN weapons inspectors located an impressive biological weapons capability. At its Salman Park Laboratory outside of Baghdad the Ministry of Defense had stockpiled 5,300 gallons of *clostridium botulinum* before 1991, 158 gallons of concentrated anthrax bacteria, as well as viral agents that cause hemorrhagic conjunctivitis and chronic diarrhea (Eddington 1997). During the 1980s Iraq produced, procured and stockpiled a large amount of chemical weapons; these weapons were intended to be used in Kuwait as detailed in the next section.[8]

Classified Iraqi State intelligence document No 8 dated 17 April 1990 reveals that the Iraqi forces were trained to use chemical weapons "when and if they deemed it necessary" long before the Gulf War commenced. They were requested to don masks 24 hours a day in the battlefield because the wearing of masks increases the fighting power of the soldiers and lessens their fear in the battlefield.[9] This huge arsenal of chemical bombs paints a clear portrait of the

[8]Independent American journalist Nir Rosen drafted and collated a lengthy documentation of the post-2003 U.S. Occupation in Iraq, in particular he writes copiously about the 2004 Falluja Massacre. One of his Iraqi colleagues observed: "The nature of the people here is violent because they grew up with weapons since childhood and weapons become part of our personality." (Rosen 2006). In essence, the rapid militarization of Iraq during the 1980s not only bolstered its weapons stores; it also impacted the psyche of its people and their perception of everyday life. One can only speculate that the level of pathological outcomes went up in the following years.

[9]Also the available sources, coupled with valuable military experience suggests that a top-notch training requires between 3-8 hours, during which they must wear protective equipment continuously. The document also emphasizes the import of wearing these masks and taking the following precautions:

--Troops should have continuous and repeated rest periods
--Troops taking part in this kind of warfare should be withdrawn after the passage of the prescribed period.
--Troops should be trained in methods of decontamination theaters of chemical war.

These instructions shed light on the willingness of the Iraqi regime to use such bombs and weapons.

insidious—possibly savage-- plans to deploy this universally prohibited form of warfare (Eddington 1997).

**SCUDS from Baghdad**

In December 1990 in the 5th month of the Gulf War, Hussein authorized the use of SCUD missiles.[10] SCUDs were responsible for most of the coalition deaths outside of Iraq and Kuwait, for example, in Israel. These muscle-flexing moments leveraged the blazen Iraqi approach to Kuwait (Eddington 1997). As these military incursions became more and more frequent, Kuwaitis were feeling petrified, as this young college student recalls:

> I have all these images of soldiers passing in front of our house. Somehow I remember my mother's fear; any second one of these soldiers will walk toward our house. At one point dozens of tanks were lined up right in front of our house, literally! Everyone tried to hide the truth, but I knew somehow. The darkness of the basement was illuminated solely by two or three candles made that gloomy brown light—it was the definition of terror (Pepin-Wakefield, 2008).

Clearly, local residents became very familiar with the physical machinery of war. The abundance of this machinery most likely caused increased stress levels as well as chronic fear of the unknown. Reports on the presence of chemical weapons in Kuwait and southeastern Iraq were received from multiple sources. In *Gassed in the Gulf* Eddington cites 55 recorded chemical weapon

[10]They killed one Israeli directly and one Saudi security guard. Twenty-eight members of the Pennsylvania National Guard were killed when one struck a United States Army barracks in Dhahran, Saudi Arabia.

releases in January and February 1991. Of these, at least 18 occurred within the borders of Kuwait (Eddington 1997). Iraqi units were observed constructing chemical decontamination trenches, and several chemical weapons storage locales were identified (Eddington 1997). To this end, a total of 24 decontamination and/or wash-down sites—built by Iraqis--many with multiple decontamination stations, were isolated in Kuwait prior to the ground war (Eddington 1997) Several of the human intelligence reports that were submitted during the late 1990-early 1991 period were rather specific (Eddington ibid). One report from 1991 stated that each of the Iraqi brigades had organic artillery units with eight mustard and binary chemical rounds (Eddington ibid). It was believed that the Iraqi commanders would order the use of such weapons if they were attacked. Some individuals reported the exposures thusly:

> Late on 24 February 1991, an element of the Iraqi III Corps was concerned about the possible existence of chemical traces in the area and that the element's chemical detection gear was not working. (Eddington 1997).

Nonetheless, the Czech forces[11] were one of the few, if not the only, willing to publicly admit to detecting nerve agent use after a February 21, 1991, SCUD missile attack on the King Khalid Military City (KKMC), Saudi Arabia, located 56 miles southwest of Kuwait (Eddington 1997).[12] These potent

[11] The Czech government supplied 300 troops as part of the allied response during Desert Storm. Of these troops stationed in Saudi Arabia, 58 were chemical weapons specialists and they brought were equipped with an array of state-of-the-art chemical detection equipment, including truck-mounted chemical labs.

[12] As Gen. Miroslave Vacek, a former Czech Defense Ministry in involved with the 1990 Czech

ingredients were capable of producing 100,000s, if not millions of deaths in Iraq and Kuwait (Shenon, 1996; Gould, 1997). The Czech troops tried to warn the US forces, but were told that this information was too sensitive.[13] As it stood, not many lives were lost during this attack.[14]

**The US Response: A Mirage of Peace**

In the build-up to war in late 1990-early 1991, George H. W. Bush made a series of speeches in which he evoked World War II mythologies by equating Saddam Hussein with a modern-day Hitler (Brown 2004). As chronicled in Brown's "The Righteous Use of Violence: Rhetoric and Mythmaking before the First Gulf War," key stakeholders placed themselves in the public arena to "sell" their case for war, in light of the fact that certain societies are more amenable (e.g. the US) to provoking belligerent acts than others (e.g. Norway). Bush continued to insist that the conflict was not about oil, but rather was a “mission of salvation” (ibid).[15]

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deployment: “There was a certain amount of underestimation of the problem by the Americans. I suppose that if you’re waging a war, you’re counting on some losses.” (Shenon 1996)

[13] According to Shenon in the *New York Times*, US Forces had chemical weapons detection logs in which comments such as “Told them to disregard any reports coming from Czechs.”

[14] Estimates are between 200-387.

[15] These actions appeared heroic, given that Hussein’s actions threatened to change the freedom and power dynamics in the entire Gulf. Although Iraq's invasion was far from "gentile," the Allied Forces attacks did result in a tremendous number of combat deaths among Iraqis, especially later with UN-imposed economic sanctions after 1993.

There had been diplomatic possibilities for resolving the crisis since August, including Iraqi offers described by high U.S. officials as “serious” and “negotiable.” All were categorically rejected by Washington.[16]

The operative language of 1990 UN Security Council Resolution 678, adopted on 29 November 1990, “authorizes Member States cooperating with the Government of Kuwait…to use all necessary means” to implement prior resolutions “and to restore international peace and security in the area.” The resolution passed with a vote of 12 to 2, with one abstention.[17]

Finally, the consummate US response, two months after the resolution, and nearly six months after the Iraqi invasion, was to summarily defenestrate Hussein's troops from Iraq in February 1991, obliterating Iraq and Kuwaiti targets in the process, with millions of tons of ammunition missing targets and left scattered in the desert (Hoskins 1997).

By March 1991, it was cited as the first time in history that a field army has been defeated by air power. In total, between 150,000 to 170,000 conventional bombs (so-called “dumb” bombs) were dropped during the war (Clark 1992). Also fuel air bombs were used to destroy minefields and bunkers in Kuwait, including direct use against Iraqi troops (1992). These bombs were composed of

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[16]The last offer made public before the bombing started was disclosed by U.S. offices on January 2: an Iraqi offer “to withdraw from Kuwait if the US pledges not to attack as soldiers are pulled out, if foreign troops leave the region, and if there is agreement on the Palestinian problem and on the banning of all weapons of mass destruction in the region” (Knut Roye, *Newsday*, 3 Jan 1991). U.S. officials described the offer as “interesting” because it dropped any border claims, and “signals Iraqi interest in a negotiated settlement.” A State Department Mideast expert described the proposal as a “serious pre-negotiation position.” Yet, the U.S. “immediately dismissed the proposal,” Royce continues. (Brown 2004, 84)

[17]It was introduced and sponsored by the U.S., the Soviet Union, Great Britain and Canada. The negative votes were cast by Cuba and Yemen. China abstained (120).

an ethylene oxide fuel and form a lethal chemical aerosol cloud or mist on impact that asphyxiates any being within a close radius. A total of between 60,000 to 80,000 cluster bombs were dropped as well (1992).[18] Clearly this copious quantity of weapons was more than sufficient to defeat the Iraqis in Kuwait. The remaining ordinances that dot the Kuwaiti landscape today are vivid reminders of the invasion.[19]

Another strong recurrent image for many Kuwaitis is the legendary "Highway of Death:" US Air Force had been given the green light to work over that entire area [roads leading north from Kuwait City] to find anything that was moving and take it out," echoing U.S. General Norman Schwartzkopf's order "don't let anything out of Kuwait" (Clark 1992) Most of southern Iraq and Kuwait was treated as a "low-density target" (1992). Despite the fact that many of the retreating soldiers had white flags attached to their tanks or the throngs of civilians trailing them, allied forces killed thousands of Palestinian and others on this fateful day, just trying to escape Kuwait City under fire (1992; Bloom 1994).

Unlike many of its predecessors, the Persian Gulf War resulted in fewer immediate American casualties (Hoskins 1997). However, this conflict and its aftermath, in fact, dramatically changed and contaminated Kuwait's environment. During the war, allied forces used over 80,000 tons of explosives, with more than

[18] Cluster bombs are air-dropped or ground-launched explosive weapons that eject smaller submunitions: a cluster of bomblets. It has been widely reported that explosive bomblets and residue remain in the Kuwait desert to date. These unexploded submunitions can still kill or maim civilians if they encounter them by accident. Moreover, they are costly to locate and remove (Covett 2008).

[19] US Embassy diplomatic service security briefing, May 2011.

20 percent missing their targets (Levy & Sidel 1997). Many of these explosives were subsequently absorbed into the surrounding environment (HSPH 2005). Sadly, no proper, comprehensive clean up of these explosives in Kuwaiti desert has been conducted.

**The Oil Well Fires**

Once the allied forces of 28 disparate nations finally decided to invade, the Iraqi occupation quickly folded, scurrying out of Kuwait in a swarm of looting and pilfering of many everyday goods and supplies from the more prosaic--idle, office swivel chairs or microwave ovens--to luxury cars to very expensive hospital imaging equipment, worth millions of dollars (Quinn 2008, Hassan 2008).

The acts of vengeance and brutality were not limited to acts of larceny. After the last battle was fought in March 1991, Saddam Hussein and his soldiers set 700 oil wells ablaze during their retreat, leading to eight months of conflagrations (Hobbs 1994). No one could have predicted the unrelenting legacy these fires would leave on Kuwait's health. Many public health experts now concur that the oil well fires have been instrumental in raising Kuwait's mortality and, indeed, morbidity in the form of chronic illnesses –over the long term to current times (HSPH 2005). We know, too, that that there were reports of birth defects, allergies and asthmas in the few years following the war. Autism has also become a health issue that some community members believe is linked

to the war. The large extent and importance of these fires will be discussed further in Chapter 2.

After the oil well fires, there were many deposits of petrochemicals, including whole lakes, which eventually became buried under a thin layer of desert sand (KISR 2008). Over 50 million barrels of oil had been spilled over 60 percent of Kuwait's surface area (Hoskins 1997). In addition, the molten morsels of oil from the fires, *tarcrete*, wound up as piles hidden under trees and rocks. These piles of tarcrete are still visible all over the Kuwaiti desert (Bloom et al 1994). The deposits later affected crops and livestock with increased quantities of Polycyclic Aromatic Hydrocarbons (PAHs), dioxins, mercury, lead, cadmium, vanadium, and nickel detected in laboratory samples (KISR 2005).

The fires and smoke, smothering the usual crystal cobalt desert sky with blinding images of hell, released thousands of tons of sulfur dioxide, nitrogen oxide, benzene, toluene, and xylene into the atmosphere (Bloom 1994). These toxins have wreaked havoc on Kuwait's environment, including its desert ecosystem and fragile marshlands, eventually affecting the local population's health, as cited earlier (Burgess 1994; HSPH 2005). The immediate effect from the oil well fires was felt in the local population. The air became heavy, saturated with dense, petrochemical-laced smoke; soot was ubiquitous. Many of the individuals whom I met recalled going outside and returning home with black patches on their normally starched *dishdashas*, soot in their hair and black

strings of mucus draining from their noses. As a result of the nascent air pollution, asthma and respiratory illnesses have been on the increase up to 300% in children and young adults since 1992 (HSPH 2005).

When a population is living in a contaminated environment, its health suffers, either through direct or indirect exposures. Furthermore, dust storms, an exacerbating feature of Kuwait's climate, occur 10 times per year with varying degrees of intensity, and have served as the main vehicle to spread these potentially contaminated sands over Kuwait, Saudi Arabia, and also it southern Gulf neighbors (MoI 2006). Given the complex nature of the environmental pollution, it remains difficult to estimate and model the exact exposures for the Kuwaiti population.

Under the auspices of the United Nations Compensation Commission,[20] Kuwait was compensated 864 million dollars by Iraq for its 6-month illegal invasion, terror-related activities and 7-month occupation (UNCC 2005). These monies were mandated to be applied towards public health and remediation. Specifically, the government of Kuwait has launched what is purported to be the most costly remediation project in history reaching costs of 2 billion dollars (Barber 2007). Known as the National Focal Point, this agency strives to implement projects that will ameliorate the ground water, clean up the oil contaminated soil and rehabilitate the desert ecosystem (Barber 2008). The

[20]This international agency was established in 1991 in Geneva, Switzerland, as a subsidiary organ of the UN Security Council. Its mandate is to process claims and pay compensation for losses suffered as a direct result of Iraq's invasion and occupation of Kuwait. Its sister Kuwaiti organization was PAAC, recently re-baptized National Focal Point (NFP).

National Focal Point is in charge of managing this program with tepid results and has not reached its mandate. The NFP has expressed concern that there is increasing pressure to execute the remediation of the oil lake area. In brief, the NFP has not been successful in carrying out any semblance of clean up of the Kuwait environment.

**Immediate Environmental Consequences of the War**

For all of these reasons, the Gulf War presented new challenges to the world community. The spread of the chemicals from the oil well fires reached well beyond the borders of Kuwait (Larson 2007). Often when we think of widespread chemical warfare, we harken back to Vietnam and Agent Orange. Between 1962 and 1971, the US military sprayed roughly 11 million gallons of Agent Orange across large swaths of southern Vietnam (Stocking 2010). Agent Orange is a dioxin-based defoliant that is known to cause birth defects and cancer. Dioxin stays in soil and the sediment at the bottom of lakes and rivers for generations. It can enter the food supply through the fat of fish and other animals.

According to a recent poll, eighty-two percent of Vietnamese said the United States should be helping people suffering from illnesses associated with the herbicide, including children with birth defects. Vietnam says as many as four million of its citizens were exposed to the herbicide and as many as three million have suffered illnesses caused by it. Unlike Vietnam, however, the government of Kuwait is not championing their patients' grievances (Stocking 2010). Vietnam

is actively seeking redress for its citizens, but is meeting resistance from the US government (Stocking 2010[21]). Also Agent Orange is more or less a national issue, whereas the sheer scale and size of the oil well fires means that it may approach Chernobyl in the terms of the span of nations and populations it has affected.[22] In this way, one could argue that Agent Orange was used as a weapon against health; in Kuwait and Chernobyl the health impacts were not as obvious from the disaster's outset.

The physical environment is a major factor that has changed since the Gulf War. During this conflict, Kuwait was bombarded by conventional, biological, radioactive and chemical weapons for a couple of months. Also chemical weapons were stored in many areas of Kuwait, with leaks recorded at regular intervals (Eddington 1997). The long-term consequences of the release and storage of these weapons remains to be elucidated (1997, 2011). Around 2006, E Ecology performed a clean up of depleted uranium commissioned by the Ministry of Defense, in conjunction with the US Department of Defense (DOD). They set up a special processing facility to receive contaminated soil for remediation. Once the sands were passed through this facility, they were placed in 55 gallon drum containers and put into a restricted area. They drums cover an area equivalent to 2/3 of a football field. At the end of April 2008, DOD reported transporting a few metric tons of soil contaminated with depleted uranium from

[21] Stocking, B. Vietnam, US Still in Conflict over Agent Orange Burden by *Associated Press*: June 13, 2010

[22] Countries known to have been exposed to soot from the oil well fires: Iraq, Saudi Arabia, Bahrain, UAE, Qatar, Oman, Iran, Nepal and possibly other south Asian countries.

Camp Doha, Kuwait, through the Columbia River Gorge, to a remote location in Idaho (Kuwait Times 2008). Despite this seemingly Herculean effort to remediate the environment, many sources report that the environment is still widely polluted in Kuwait (Barber 2007, KISR 2003).

It is difficult to attribute DU exposure to the cancer risk observed due to possible co-exposures from the post-war environment. For example, other carcinogens were released into the Basrah environment when Saddam purposefully set fire to Kuwait's oil fields (Al-Azzawi, 2006; Hinden et al, 2005). As is the case in Kuwait, Chernobyl patients had to struggle for recognition of their illnesses linked to disaster. The issues surrounding disease recognition and risk definition, also known as biological citizenship, will be covered in a later chapter.

This interdisciplinary documentation—with a focus on historical, political economy and environmental health-- gives the reader a better understanding of the war's geopolitical, social and economic context, rather than the conventional quips I have often overheard “it was a six-week, efficiently-faught incursion, for which the Kuwaitis repaid us the total cost” (Cange 2009). Rather, this war and its ill-health legacy has reverberations for the entire region, and ultimately set the stage for the second Gulf War, also known as the “Iraq War.” This war was recently officially ended; however security forces in Iraq are still being maintained, albeit by way of mercenary proxy, ten years after its commencement with little hope of complete political disengagement in the near future. Indeed,

exposures from this war were a panopoly of sources, and it is critical to understand these sources within this historical context.

The postcolonial period was a time of transition for Kuwait and Kuwaitis. As the country was relishing its newfound petrol wealth, its less affluent neighbor, Iraq, was seemingly jealous and giving it the proverbial "evil eye."[23] Indeed, Iraq was anxious to share in Kuwait's abundance of oil and gas profits. Also, for the first time, Kuwait's new government was dealing with Sunni-Shia rifts. During the 1960s and 1970s, Iraq made its first overtures at territorial claims. By the time the Iraq-Iran war had come around, Kuwait was already nearly developed, at least compared to all of its regional neighbors. However, it took Iraq's fateful 1990 invasion and occupation to shock the nation into a brutal reality: oil=>wealth=>insecurity. The vast military build-up of Iraq was quickly rescinded in a matter of years, and the UN sanctions left the country in ruins. For Kuwait, Hussein's actions led to one of the world's worst environmental disasters (CNN 2010). Permanent, irreparable damage had already been wreaked on this tiny city-state. Sixty percent of Kuwait's landmass had been covered in tarcrete and oil lakes. The once pristine desert was now reduced to a petrochemical graveyard.

These chemicals and psychological stressors affected everyone living in Kuwait--given the size of the nation--at that time. And given that these exposures only festered over time, many individuals began to get sick. It was widely reported that miscarriages skyrocketed in the immediate post-war period

[23] Evil eye is an Eastern concept referred to frequently in Kuwait.

(MoH 2001). For other exposures, and given that there was no forthcoming environmental clean-up, cancers, autisms, M.S. and other illnesses started to be widely reported (Hammadi 2008). The public felt a panic and a certain fury at the lack of governmental response. Some wondered if the wartime chemicals had played a role in these pandemics; others felt it was related to the traumatic events of the war.

For all of these reasons, the Gulf War History is instrumental in conceiving this project. History is a staple of ethnographic analysis, but remains relatively new in epidemiology. In the Life Course approach, the community and individual history informs the researcher as to the origin of the disease of interest. Chapter 2 will introduce the Life Course approach as the foundation of my research project.

After a war, epidemiologists should be concerned with long-term surveillance for various maladies as sometimes latency periods vary--and can be misleading. Moreover, many examples have shown the long-term impacts of warfare on health. Perhaps more importantly, we need to heed the warnings of history, as it often repeats itself.

## CHAPTER 2

## The Gulf War Critical Period: Life Course as a Framework for Post-Conflict Health Analysis

Contemporary public health research relies on conceptual, causal models that posit connections between social factors and health outcomes. These models attempt to describe numerous phenomena that influence populations *writ large*. Few such models examine violence and aggression, as manifested during armed conflict, as deviant social phenomena that gravely harm population health (Levy & Sidel 1997; Loretti 2003; Masten 2012). Life course theory emphasizes the sociological and biocultural contexts, like armed conflict, that sway population health outcomes over time (Ben-Shlomo & Kuh 2002).

In the next section I propose a culturally-sensitive conceptual model based on life course theory to explain how armed conflict and environmental degradation, in fact, are still impeding Kuwaiti health today and guide the mixed-methods approach of this study. Few research projects of this scope use mixed-methods making the present project unique (2012). Life course approach, based on conceptual models by Ben-Shlomo and Kuh, and other public health theorists, will facilitate understanding the structural and contextual elements that interact to influence health in post-conflict societies. This approach is a key element of my project because it drives the research question: did wartime exposures lead to increased cancer, and in particular breast cancer, in Kuwait today? How do chemical and psychosocial Gulf War exposures impact the body over the life

course? In particular, the mixed-methods of this study are concerned with temporal parameters identified in the model (e.g. latency).

**Life Course Model**

Figure 1 presents the study's life course conceptual model as dervied from Ben-Shlomo and Kuh's model in their 2002 publication. The pathways in the model address a twofold goal. On one hand, the pathways represent a framework of multicausality (Ben-Shlomo & Kuh, 2002; Evans & Stoddart, 1990).[24] Yet, on the other hand, they should be specifically defined to applied problems (Chandola et al, 2006). In this dissertation, I am interested in the impact of armed conflict on health outcomes over the life course in Kuwait, and particularly the pathways[25] through which armed conflict causes changes in health on a population level. In my research question, I cite armed conflict as the main driver, and therefore the critical period, behind Kuwait's dramatically increasing rates of breast cancer, particularly among young women.

**Exposures**

Biological systems are sensitive to the accumulation of various psychosocial and chemical exposures over a life course from different environments (Bronfenbrenner 1979, Elder 1994, Meaney 2001, Halfon 2002, McEwen 2008, Sameroff 1998). As a consequence, indirect outcomes, such as stress or bodily chemical dosage, build up as we grow older and our bodies are

[24] Many factors influence health, and the life course perspective incorporates both temporal and hierarchical dimensions of these pathways

[25] Here I am speaking generally, beyond this model, and indeed preparing the reader for Chapter 3.

less able to perform regular maintenance and repair. These life pathways, or trajectories, involve long-term patterns of stability and sundry transitions in a person's life (Bronfenbrenner 1979, Elder 1994, Halfon 2002). Health-related trajectories of an individual are not necessarily straight lines, but rather are ebbing and flowing over time. For the purposes of the present conceptual model, the individual health pathway is represented by a single line in the center of the circles. These exposures affect one's behavior and physical and social development.

**A Layered Life**

In my life course schematic representation (Figure 1), several factors working in concert may influence health outcomes over a given period of time. Modern child development is based on progressively more complicated interactions between the child and his or her environment (Bronfenbrenner 1979, Halfon 2002). In both Ben-Shlomo & Kuh's life course and Bronfenbrenner and Hertzman's ecology theories, the child lives simultaneously within several layers of society: micro-, exo-, macro-, meso-, and chrono-. He or she is gradually introduced to more layers with age. In the figure, I start with the individual layer, and build up to the family, community, national and lastly the regional layer for the Kuwaiti context. Most individuals are born into a family, and in Kuwait these family units, more commonly known as tribes, are very integral to one's social support structure (Llabre 1997). At the community level, the individual is participating in at least one setting, considered a primary link (e.g. school). The

community also includes the parental employment and localized services (e.g. district health clinic). Over time, the child ages and becomes more engaged in his or her community including health care, education, tribal activities and social activities. These other activities can include neighborhood associations, libraries, religious gatherings and playgrounds. Bronfenbrenner refers to these processes as "the primary engines of human development" (1979). [26]

At the national level, the individual is influenced by civil society and governmental programs: health care, legal system, elections, social services, as well as the intangible characteristics of those institutions: culture, alienation, crime, national psyche and others. Lastly, there is the regional level which includes impacts of regional or international politics on the individual's livelihood and health. For example, when a large quantity of toxins is released in the air, the toxins permeate past borders, thereby polluting other nations' air as well (Ben-Shlomo and Kuh 2002, Elder 1994, Halfon 2002 , Kimmel 2001, Werner 2001). These multi-factorial relationships include a bevy of interactions among various layers in which an individual lives.

In Chapter 1, I discussed at length the impact of historical and political influences, macro trajectories that precipitated the Gulf War. Indeed, the Gulf War presents two discrete exposures—chemical and non-chemical to the Kuwaiti population. These are evidenced by the lower Exposure box in Figure 1. In Chapter 3, I expound on micro trajectories: individuals and families live in multiple contexts where intersecting trajectories are common: educational

[26] The aging child can also engage the environment in a life of gang violence, drug and substance abuse, and school dropout—but Bronfenbrenner, as a follower of positive psychology, chooses to give the child the benefit of the doubt and emphasize the positive outcomes .

trajectories; work trajectories; health trajectories and so on. Life experiences—by way of these various trajectories--should emphasize the social dynamic of and between generations (Halfon 2002). Myriad connections across generations serve to integrate relations between the young and old (Bronfenbrenner 1979, Elder 1994, Hertzman 1999, Halfon 2002, Werner 2001). These connections could be within families, or of a more informal nature, such as between an older mentor and younger mentee at the Boys & Girls' Club (Krieger 1994).

Also, intergenerational pathways expose critical implications for genetic exposures that get passed from one generation to another.[27] The diversity of life conditions become "embedded" in the body, or in the bodies of the wider community if the exposure (e.g. major trauma) has occurred on a larger scale (Ben-Shlomo and Kuh 2002, Krieger 2005, Bronfenbrenner 1979, Elder 1994, Meaney 2001, Halfon 2002, McEwen 2008, Sameroff 1998). Embedding signifies events or insults that are biologically programmed and thus somatically part of the organism. In other words, they cause biological alterations to the individual's health pathway. Biological alterations are permanent changes that may occur at any level, but this study is particularly concerned with the genetic, immunologic and endocrine systems. This concept will be further explained in the section "Violence Embodied" in Chapter 7.

Environmental exposures impact human developmental processes, and these processes will be explained as they pertain to the life course approach in the following sections.

[27] DNA mutagens may have impacts on one's grandchildren or great-grandchildren depending on the dose and time of exposure. Studies from Nagasaki and Hiroshima have shown concrete evidence of radiologic-induced germ line mutations that affect 2nd and 3rd generations' health.

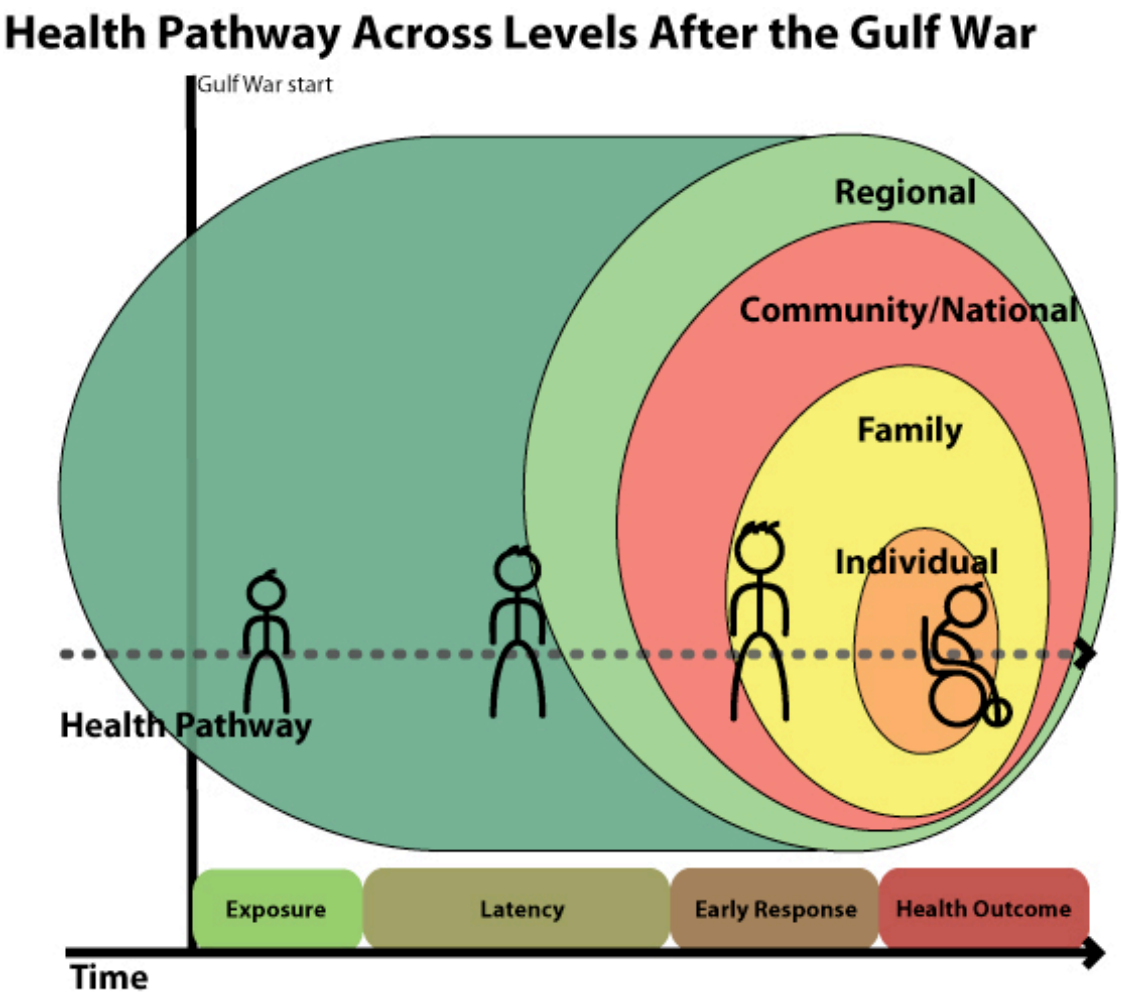


Figure 1. The Health Pathway and Adverse Health Outcomes over various levels and across time
Conceived by CW Cange; designed by CW Cange and Alex Tu

**The First 20 Months of Life**

Population health begins early: the first few months post-conception are incubatory moments in human development. Early life exposures influence health trajectories related to development; growth, reproductive maturation and fertility are impacted (see Figure 1). If a fetus, or infant, is exposed to toxins in the delicate phases of development, these exposures can affect its childhood development and, eventually, adult outcomes (Evans & Stoddart 1990, Ben-

Shlomo & Kuh 2002).[28] By 20 months of age, the average developmental quotient for poorer children with higher levels of perinatal stress was recorded to be much below similarly stressed children from richer families (Werner 2001). The complexity and rapid nature of neural development create a critical period of neuronal vulnerability from the end of the second trimester of gestation into the first decade of childhood (Barker 1994, Ben-Shlomo and Kuh 2002, Elder 1994, Kimmel 2001, Werner 2001). It has been observed that age-specific experiences determine the structural and functional attributes of the developing nervous system (Ben-Shlomo and Kuh 2002, Kimmel 2001, Werner 2001). Infant mortality rates can be readily correlated to socioeconomic gradients, as well as differential levels of stability and security in early childhood (Bronfenbrenner 1979, Elder 1994, Meaney 2001, Halfon 2002).[29]

**A Good Time to Age**

Chronological age does not definitively indicate the "timing" of our lives (Elder 1994). By timing I am referring to the various benchmarks when an individual reaches a different life stage (e.g., adolescence may come at 10 years old or at 15 depending on the individual). The cultural context of child socialization is highly correlated to learning behaviors determined as a function of age, rather than "age expectations" (Bronfenbrenner 1979, Elder 1994).[30] That is

[28] In my quantitative and qualitative studies I am interested in cancer in women, and particularly breast cancer, from 18-80 years old; in other words, babies born just before or during the Gulf War may have been exposed and now developing breast cancer (after a suitable latency period, also truncated due to exposure during the critical period).

[29] This study will indirectly focus on the effects of the Gulf War on pregnant women and/or those with babies in the critical stages of development (now 2-25 years old).

[30] Age-specific differences in roles and behaviors are the result of biological, psychological, social, and

to say, age-graded differences in roles and behaviors are the result of biological, psychological, social, and spiritual processes (Bronfenbrenner 1979, Elder 1994, Meaney 2001, Halfon 2002). The psychosocial aspects of the study will be discussed further in Chapter 3.

Studying early life factors also enhances our understanding of adult chronic disease because these early life factors may confer additional independent risk on the individual much later in life (Barker 1994). Hertzman refers to health risks that are experienced at different ages[31] and then combine to increase accumulative risk of disease in adult life (Hertzman 1999). Early life factors and their later, accumulated life health effects represent a central concept to both life course and ecological system theories when a critical events severely disrupts an individual's health pathway.[32]

Lastly, the presence of many emotional and behavioral problems in childhood often leads to psychological or, perhaps, physiological prolems in adulthood. However, these problems will not necessarily affect one's well-being in adulthood *per se*. In other words, empirical evidence does not support the continuity theory as an explanation for such problems (1979, Elder 1994, Halfon 2002). Rather, many individuals are resilient and overcome these challenges by mitigating their effects and lead normal lives (Barker 1994, Ben-Shlomo and Kuh 2002, Werner 2001). For example, in one study of military personnel (both deployed and non-deployed) after a traumatic event, 83% of individuals were

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spiritual processes (Bronfenbrenner 1979, Elder 1994, Meaney 2001, Halfon 2002).

[31] This theory is known as *"chains of risks"*

[32] The point here is to emphasize the pervasiveness of exposures during the gulf War, and that they will be effects for generations to come. Also, children will be adults by now in Kuwait.

able to cope and overcome the traumatic impacts of the event on their health. (Mancini 2012).

**Critical and Sensitive Periods**

Thus Ben-Shlomo & Kuh define the critical period as a specific time during which an exposure can have adverse or protective effects development such that the individual experiences negative health outcomes in later life (ibid 2002). If a fetus, or infant, is exposed to toxicants in the first delicate phases of development, these exposures may affect its childhood development and, eventually, adult outcomes (Barker 1994, Ben-Shlomo and Kuh 2002, Elder 1994, Werner 2001). During a *critical period*, biological and developmental processes are more sensitive (Bronfenbrenner 1979, Hertzman 1999, Ben-Shlomo and Kuh 2002, Elder 1994).

The intrinsic changes that occur in critical developmental periods are usually irreversible; sensitive developmental periods also represent times of rapid change, but there is more scope to modify or perhaps reverse those changes outside the window period. In this context, the relevance of changes during a *critical period* are reflected by way of the intermediate markers of disease risk, usually many years after the critical period.

In Figure 1, this period is represented by the exposure box under the child. Outside this window, the developmental mechanism for mediating exposure and disease risk is no longer available. A *sensitive period* is a time period when an exposure has a stronger effect on development and hence

disease risk than it would at other times (Elder 1994; Ben-Shlomo & Kuh 2002). In other words, the same exposure outside this time period may still be associated with increased risk but this association is weaker than during the sensitive period.

In epidemiological terms both critical and sensitive periods may be understood as qualitatively different exposure-time interactions. For critical periods, there is no excess disease risk associated with exposure outside this time window, while for sensitive periods this risk is merely weaker (Elder 1994; Ben-Shlomo & Kuh 2002). Although critical period exposures may appear obvious if they act during fetal development, they are not necessarily so limited. For example, the elevated risk of multiple sclerosis amongst European migrants to South Africa is only observed if migration occurred after the age of 15 years (Dean & Kurtzke 1971). Sensitive period effects for chronic diseases are far harder to demonstrate empirically. This period is also known as "susceptibility" in the biomedical community. Sensitive and critical periods are thought to differ by physical or mental condition.

Sensitive periods can also be defined in terms of exposures (Ben-Shlomo 2002). The individual is affected simultaneously by exposures from many contexts. Exposures, in the broadest sense of the term, could be compounded from the stressful effects of life transitions.[33] In the Kuwait context, there were a

[33]The life course approach proposes that each person experiences a plethora of transitions in social and professional roles over his or her lifetime (Ben-Shlomo and Kuh 2002, Bronfenbrenner 1979, Elder 1994, Hertzman 1999, Meaney 2001, Halfon 2002). Many transitions related to family life take place: births,

series of chemical and psychological Gulf War-era exposures that left permanent damage. The critical period was the time when the war commenced and bombs were dropped in January 1991 until December 1991 when the last of the oil well fires was extinguished. Exposures of these types present different risk and protective factors. Similarly, exposures are of many varieties: chemical, spatial, economic, social, racial, among others. This includes *where* and *how* the child grows up. *Early rearing environments,* for example*,* or exposure to good or bad parenting (i.e. doctor visits), transform the expression of genetically programmed neurotransmitter production and behavioral outcomes (Meaney 2001, Halfon 2002, Hertzman 1997). Issues around parenting are important in Kuwait where many children are raised by caregivers (e.g. nannies).

**The Latency Period**

The *latency model* of the life course approach posits that discrete events have a strong independent effect in later life (Ben-Shlomo and Kuh 2002, Halfon 2002, Sameroff 1998, Werner 2001). The latency period is the time between exposure and the emergence of the first symptoms of illness and is represented by the latency box in Figure 1. Body systems represent complicated networks of cascading hormones, proteins and other compounds that are easily disrupted by foreign chemicals or compounds. In this model, studies have shown that specific types of diseases, such as cancer, emerge 5-60 years after exposure to cancer-inducing chemicals or a serious injury without any intervening exposure to

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marriages, divorces, remarriage, and deaths. Each life event changes family roles, and thus involves a panoply of exits and entrances of family members.

carcinogens (Ben-Shlomo and Kuh 2002, Elder 1994, McEwen, Meaney 2001, Halfon 2002, Sameroff 1998).

The latency period also reflects the stress-vulnerability theory (Adams 2005). In looking at the World Trade Center disaster, Adams et al found that the affected communities in New York City recorded higher levels of alcohol abuse, domestic violence and other related social tensions, and this was particularly higher among communities of color (Adams 2005). Furthermore, after a latency period of only a few years (e.g. 2004), the residents were, at a community level, exposed to other life events and social stress (e.g. divorce, drug abuse, etc), making them more vulnerable, above and beyond the cumulative effect of the individual stressors, and negatively impacting their well-being (Adams 2005). The Bronfenbrenner model also suggests that there is a cumulative effect across the various socio-demographic layers when stress is at play. The Gulf War was a period of unparalleled sustained stress, and in many cases, trauma, for most Kuwaitis (Casey 2007, Dinkha 2007, Hammadi 1995). In other words, extreme stress from a critical event speeds up the usual latency period, and may be part of a synergistic effect that leads to negative health outcomes over a much shorter period of time.[34]

**Study Innovation and Significance**

The Gulf War in Kuwait presents itself as a unique case study given the troubling, persistent manifest consequences twenty years later. Some of the

[34] And possibly more virulent outcomes, but this topic is outside the scope of this discussion.

illnesses believed to be associated with the war have been poorly studied (e.g. leukemia) or rather neglected (e.g. M.S.) in previous research on this topic. Indeed, previous health studies in post-conflict settings suggest that researchers must be steadfast and creative to obtain rigorous, conclusive results because data are not always readily available—either from a lack of structural organization or because war is an inherently political device and the responsible governments may beare concerned about how blame may be assessed in the post-conflict period.

Previous post-conflict studies, such as the Harvard Kuwait Health Study[35], have not found a concise connection between the environmental degradation and health effects—at least one that is known publicly. This study is on-going but its current mission has not been publicly revealed nor is there a plan for disseminating information or educating the public about persistent health risks. My study, as stated above, makes a stark departure from previous studies because it employs a novel, mixed methods approach. Mixed methods rely on the process of triangulation to reach what are considered to be the true results.[36] The triangulation methaphor originates in the navigational and military fields where it was a strategy that used multiple reference points to locate an object's exact position thereby providing a highly accurate measurement (Jick 1979; Bazeley & Kemp 2012).[37] In other words, a mixed-methods approach employs

[35] The Harvard Health Study is a joint for-profit project launched by Harvard School of Public Health and a Kuwaiti consultancy, Kadema in 1992. The Project has studied many aspects of Kuwait's health in the post-conflict era, however, only one paper has been published—even though 10,000 of biospecimen and surveys have been collected and analyzed.

[36] Although mixed methods are believed to be "new" to public health actually they have been in the social science literature since 1959 (Campbell and Fiske in Bazeley and Kemp 2012).

[37] Triangulation is the combination of methodologies and/or viewpoints in the study of the same

several data methodologies simultaneously; where the results overlap is most likely the most scientific conclusion (Bazeley & Kemp 2012; Jick 1979; Sandelowski 2000).

**Qualitative Methods Measure Cultural and Macro-level Social Influences on Health**

Several pathways of exposure coalesce to influence health outcomes. *Life pathways* represent multi-determinant conduits from which children are influenced by the dominant historical, social, economic and cultural environments (Ben-Shlomo and Kuh 2002, Bronfenbrenner 1979, Elder 1994, Meaney 2001, Halfon 2002, Werner 2001). These larger, contextual factors are incorporated in the qualitative health assessments (DiGiaccomo 1999, Trostle 2005) and will be assessed in Chapters 4 and 7.

Medical anthropology and sociology have focused on larger contextual factors impacting systemic disparities in health care since the 1970s. Political Economy in Medical Anthropology (PEMA) pays attention to macro-structural questions—such as those explained by historical analysis in Chapter 1--and the role of social power on health (Henry 2006; Morgan 1987).[38] Morsy advocates tying these micro approaches into the societal context on a more consistent basis, thus creating a "micro-macro mix" (Morsy 1990). In Chapter 4, I built an

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phenomenon.

[38] Critical medical anthropological theory offers ethnographic tools to begin to answer these questions. The basis for this theory has been clearly defined by Morsy and Baer, medical anthropologists, as one branch of medical anthropology that integrates political, economic and historical approaches by examining structural, contextual effects as they pertain to health outcomes (Morsy 1990; Baer 1996) Given these cultural and medical taboos, I referred to best practices in the anthropology literature fo

ethnography of post-conflict communities based on individual interviews, and small group interactions. Such a mix would include interview and survey data, larger demographic databases and epidemiologic data from both the individual informant in concert with information about the informant's context, normally social and political processes operating to influence the underpinnings of broader health issues. Life course analysis, a branch of medical sociology, has embraced similar techniques since the mid-1990s.

Fortunately, epidemiology is focusing more and more on multi-factorial and ecological analyses, and emphasizing less and less the one-exposure, one-dose, one-outcome paradigm (DiGiacomo 1999, Petryna 2002, Slovic 2000, Trostle 2005). As risk assessment experts Trostle, Slovic and others have reported, quantitative methods as detailed in Chapters 5 and 6 are not often equipped to measure cultural and social factors that play a role in the development of disease. Indeed, in conventional epidemiology, culture is "controlled for" as a risk factor (DiGiacomo 1999, Petryna 2002, Slovic 2000, Trostle 2005). Rarely is it viewed as a "protective factor." These cultural elements of epidemiologic risk have been treated earlier in this text, and will be discussed in more depth in Chapters 4 and 7. In a post-conflict health analysis, a multi-factorial and ecological approach[39] will be necessary given the inherently contextual nature of the conflict and the health care setting in which Kuwaitis seek care and conceive notions of illness. From this approach I am asking: What do Kuwaitis express about the effects of the war on trauma and cancer

r medical ethnographic research. These practices helped me navigate fluid procedures for requ

**Mixed Methods in Action: how the study pieces come together**

In this present study, Figure 2 shows how Chapters 5, 6, and 7 work together to answer the project's main research question, namely whether the war has lead to increased breast cancer in Kuwait? Often, a mixed-methods approach is more complete, or even holistic, because it offers overlapping variance with the use of multiple measures (Jick 1979; Johnson et al 2004). Indeed, these measures may uncover some unique variance that a single method cannot obtain or from a simple combination of a couple methods (Jick 1979; Johnson et al 2004; Bazeley & Kemp 2012).

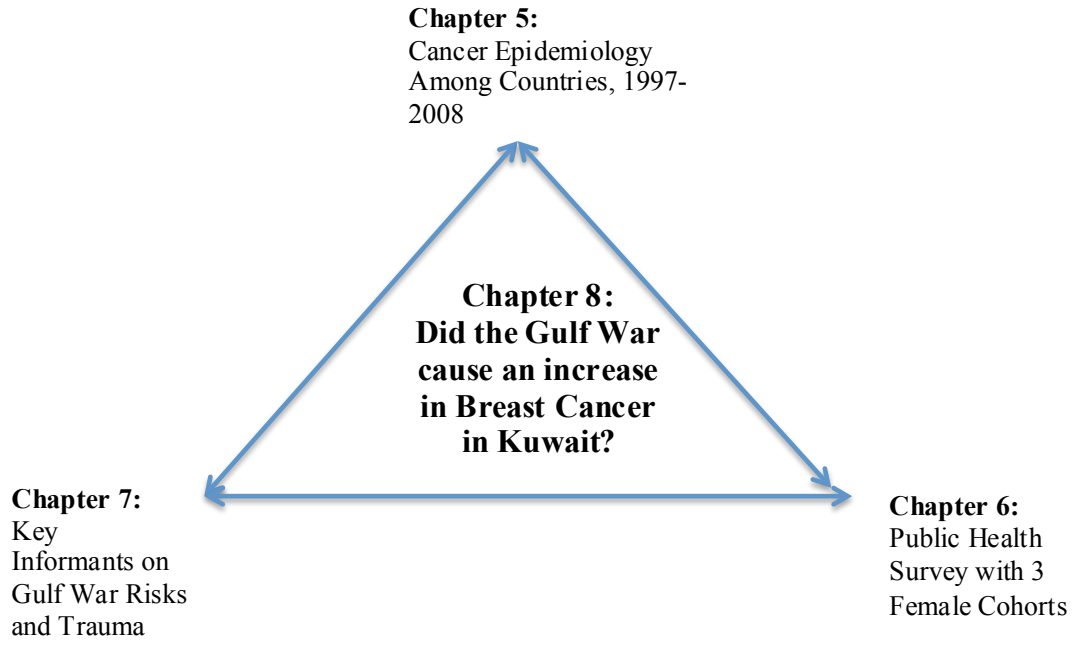


Figure 2. Complementary Triangulation Among the Empirical Chapters

Other authors discuss how mixed methods relies on several different combinations of qualitative and quantitative approaches (Maggs-Rapport 2000;

Sandelowski 2000). The research project can be mixed at the paradigmatic, methodological and technique levels (Maggs-Rapport 2000; Sandelowski 2000). In particular, I am employing an analysis that combines statistical, descriptive, structured approaches (Chapters 5 and 6) with unstructured and narrative analyses (Chapter 7) of the various pieces of data that I have collected in Kuwait. These qualitative data mainly take the form of key informant interviews with community leaders and organizers. The interviews focus on the environmental and psychosocial impacts of the war on health. In this project, there is obviously such a mix, and indeed the analysis is complementary[40] because of the various aforementioned types of data sources and techniques involved. Chapter 8 will provide the overall conclusions by triangulating results from the empirical chapters and thus answer the research question. This triangulation means that the data from each chapter will be compared and contrasted amongst each other to find where they provide evidence to answer the research question. Again, to the author's knowledge, no previous Gulf War health study has collected such a varied array of data and analyzed them using these methods.

Table 1 explains the key differences among all the chapters. Namely, the three empirical chapters all present information using several different methods and types of causal inference.

Table 1. Empirical Chapters' Characterization

esting permissions to enter sites of research.

| Chapter | Topic | Data Source | Level of Analysis | Analytic Method |
|---|---|---|---|---|
| Chapter 5 | Regional Cancer Epidemiology | Cancer Registries, archives | Population | Structured, Quantitative |
| Chapter 6 | Trauma and Alienation related to Breast Cancer | Survey instrument, archives | Clinic & Individual | Semi-structured, Quantitative – Qualitative (Descriptive survey) |
| Chapter 7 | Locally-identified Cancer Risk Factors | Key Informant Interviews, newspapers | Community | Unstructured, Qualitative |

The main advantage of a life course approach is that it contextualizes the event of interest—in this case, the Gulf War--for public health researchers who all too often use research methods that do not encompass the larger, societal issues. Instead researchers often prefer to focus on one, localized dose for one, very specific outcome. To this end, while this dissertation uses breast cancer as a case study, the primary aim is not to prove a link between the war and only breast cancer. Rather, this project seeks to inform the public about war-related cancer risks more generally by focusing on breast cancer as one particular concern in Kuwait. A qualitative chapter is also included wherein I investigate and collate Kuwaiti narratives about the issues raised in this chapter such as intergenerational effects, time lag, alienation, life events, chronic stress, etc. By referring to these narratives, my study will be able to triangulate the qualitative with the other quantitative ones. We expect to find that results from the qualitative inquiry suitably complements these other chapters and will be presented together with the findings in the concluding chapter (Chapter 8).

## Conclusion

In this chapter I developed an overview of life course theory's application to public health research in a post-conflict setting. In particular the concepts of levels, pathways and exposure were highlighted as they pertain to the long-term effects of the Gulf War on health. The chapter also explains the role of the latency period on individual health outcomes. For diseases, such as breast cancer, the latency period helps to inform health professionals on when to expect incidence to increase in Kuwait. In particular Kuwait has experienced sustained exposures and endured a critical period during the 11-month oil well fires.

For these reasons, we would reasonably expect that certain illnesses are higher there. With increased stress, trauma and numerous life changes in the post-conflict period, we hypothesize that cancer rates will be on the rise in Kuwait.

## CHAPTER 3

### A Study Model for Armed Conflict and Breast Cancer in Kuwait: Armed Conflict as a Sensitive Period

When all global armed conflicts in the past century (World Wars I & II, Korean War, Vietnam War, etc) are taken into consideration, researchers have measured approximately 200 million premature deaths (Peto et al. 2007). These deaths include the mass famines precipitated by the 1947 India-Pakistan Partition and the so-called Chinese Cultural Revolution under Chairman Mao (Abramowitz 2005; Desai 2003; MacFarquhar 1997). In addition, war-related violence and aggression can lead to the manifestation of various diseases, chronic conditions and/or grave learning disabilities (Levy & Sidel 1997). In the previous chapter, we reviewed life course approaches to examine the effects of the Gulf War on the health of civilians. In the same vein, I would like to analyze the possibility of individual post-conflict outcomes by focusing primarily on the Persian Gulf War and its impact on Kuwaiti health to date.

Figure 1 presents a conceptual model of the pathways, or "chains of risk," through which the two key exposures in the Gulf War may adversely affect Kuwaiti health over the life course. Those two pathways are the Armed Conflict-Environmental Pollution pathway and the Armed Conflict-Collective Trauma pathway. For this study, key concepts in the Armed Conflict-Collective Trauma pathway are resilience factors such as social support, social cohesion and barriers to exposures (e.g. functional and physical). Vulnerability factors, on the

other hand, are social alienation (*Owzla*), stressful life events, secondary traumas, economic issues and fears of a second invasion. Also, the life course-based model takes into account the influences of Kuwait Health Care, Individual Charateristics and Behavior as compositional factors. Research shows how these two pathways working in parallel may result in Adverse Health Outcomes such as breast cancer. To better understand health issues in Kuwait, I will begin with a brief overview of the health care system, individual attributes, individual behavior and the general state of health of Kuwaitis.

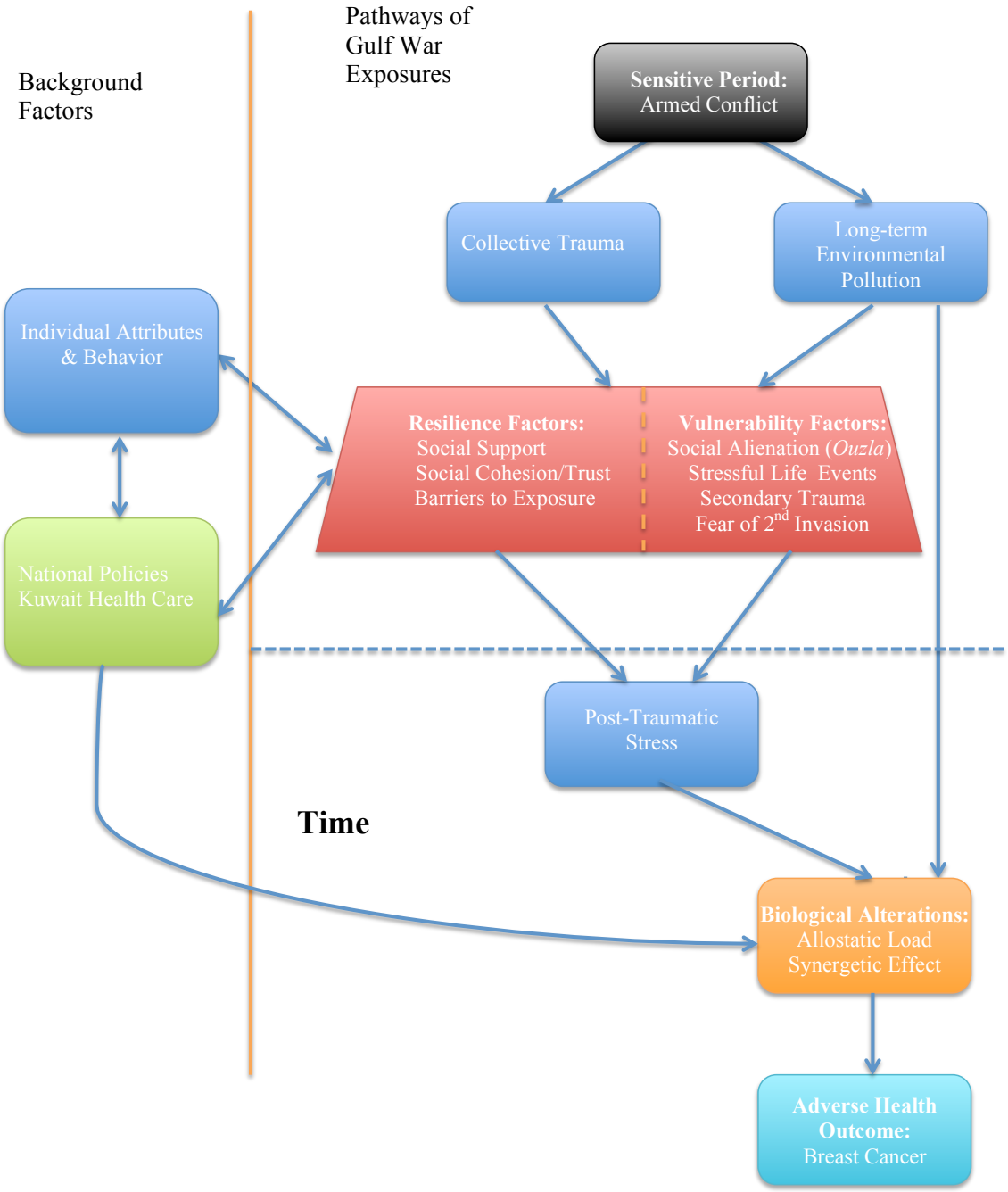


Figure 1. Conceptual Model of the dual exposure pathways following armed conflict on breast cancer development

## I. Background Factors

### A. Kuwaiti Health Care

As shown in Figure 1, health care is influenced by both individual behaviors and national policies during war, suggesting that the provision of care reduces the risk of war-related diseases, and, in fact, sustains better population health. After a tragic event, like war, one's ability to cope affects one's need for health care (Cheever & Hardin 1999). Health care services are interrelated to both compositional and contextual influences, and comprise a variety of essential services for better health (Anderson 1973; Andersen 1995; Evans & Stoddart 1990). Under normal conditions, these services are widely available and free in Kuwait. Their effectiveness is limited only by the patients' desire to seek follow-up. Health care, when available, tends to lead to better health outcomes (McGuire 1987; Adler 1993; Wagstaff 2000, 2003). However, when war disrupts the health care system, then services usually are halted, or at least, greatly reduced.[41] The services may be regained quickly, as was the case in Kuwait, or they may be off-line for years, if not decades.

The health care sector in Kuwait is almost entirely public, with several private hospitals offering care to higher SES groups (Fikri 2008). Nonetheless, nationals are eligible, for instance, to receive all medical care for free and medications, if not at cost, for nominal charges (KCCC 2004). As a result, the

[41] Such an acute, albeit drastic, cut to health care, could affect a whole cohort of infants over the life course as their mothers did not receive proper prenatal care over a 6-8 month period.

health care system is saturated with the current demand and hospital beds filled to capacity.

The government invests 200 million dollars every year in health care. With the reign of the new Emir in 2006, however, transparency has suffered greatly in many ways and across sectors (Hassan 2008).[42] Now many clinicians, as government employees, are less likely to speak openly about their patients and possible links between their illness and the Gulf War exposures (Hassan 2008). If they do speak openly, they may be unintentionally putting their jobs in jeopardy. There is increasing fear among practitoners of how these facts may make the government liable for compensation to the wider public. These issues are explained in greater detail in Chapter 4. In any case, Kuwait practitioners are screening and diagnosising patients, thereby influencing the development of disease in the population (i.e. *biological alterations*).

### B. **Individual Characteristics and Behavior**

Health care is affected by individual behaviors and vulnerability factors are possibly impacted by health care access (Andersen 1995). The *individual characteristics* (Figure 1) reflect the background attributes that may determine health outcomes. These characteristics are location, genetic makeup, pre-war mental and physical health, marital status, and socio-economic status (Ben-Shlomo & Kuh 2002; Elder 1994; Masten 2012). Also, there are specific risk factors for Kuwaiti breast cancer such as number of children, birth control usage,

[42] Transparency as measured by Kuwaitis and widely reported in the media since 2006 has decreased most likely due to insidious transfers of wealth at the top levels of government.

exercise and family history (Saleh 2008). Individual characteristics capture the unique genetics found within each person. Some individuals are more susceptible to certain illnesses than others. In a post-conflict situation one's stress reaction—adaptive or maladaptive--determines later health outcomes, including the advent of PTSD. The effects of behavior on stress will be discussed later in the chapter. For purposes of the model, it should be noted that many individual factors are ascribed (left side of model) and not seriously impacted by the event of interest. Moreover, we shall probe how lifestyle and individual behaviors can impact health before and after conflict.

As chronic illness is becoming more commonplace in Kuwait, many experts are asking for the reasons why (Prentice 2006, Abegunde 2007, Moussavi 2007, Nabel 2009, Beaglehole 2003, Kuwait Times 2008). Some of this increase may be due the aging of the population over time. Another reason may be due to the increasing proliferation of a Western lifestyle (Moussavi 2007, Nabel 2009, Beaglehole 2003). As in many developed countries, Kuwaitis favor a sedentary, car-oriented lifestyle. Moreover, due to the extreme variation in temperatures (up to 135º F in the summer), Kuwaitis tend to drive everywhere, even if the destination is only a few blocks away. Western franchise restaurants have become ubiquitous, and have replaced, for many Kuwaitis, the local bakeries traditionally frequented for late evening meals. As a consequence, obesity has risen steadily since the 1970s (Bu Abbas 2008). On the other hand, cancer, diabetes (type 1), multiple sclerosis, autism, down syndrome, and other chromosomal malformations are affecting more and more Kuwaitis (Al-Taweel

2008). In relation to its neighbors, these rates are significantly higher. The manifestation of diseases is also variable: two different individuals diagnosed with the same disease may express disparate symptoms (Zola 1966, Svedlund 1988, Jansen 2003). Consequently, they will be prescribed with different treatments, affecting their sense of alienation and health behavior, in addition to well-being. In other words, if someone does not feel that they are receiving adequate treatment, compared to his/her peers, he or she will feel more alienated (Ray 1982). More details on these matters will be discussed in the section on Social Alienation. The second set of the conceptual model tackles the correlation between war and various contextual elements: environmental pollution, collective trauma and social alienation.

## II. Pathways of Gulf War Exposures

### A. Armed Conflict and Environmental Pollution

Environmental pollution is a major factor that has changed since the Gulf War. During this conflict, Kuwait was bombarded by conventional, biological, radioactive and chemical weapons over the course of a couple of months. Chemical weapons were stored in many areas of Kuwait with leaks recorded at regular intervals (see Chapter 1) (Eddington 1997). The long-term consequences of the release and storage of these weapons remains to be elucidated (ibid 1997).

Furthermore, dust storms, an exacerbating feature of Kuwait's climate that occur ten times per year with varying degrees of intensity, have served as the

main vehicle to spread these potentially contaminated sands over Kuwait, Saudi Arabia, as well as Qatar and Bahrain (MoI 2006; Hayat 2011). Given the complex nature of the environmental pollution, it remains difficult to estimate and model the exact exposures of Depleted Uranium (DU) and Polycyclic Aromatic Hydrocarbons (PAHs) for the Kuwaiti population.

DU and PAH particulates are reported to be under 10 mm aerodynamic diameter, which is in the respirable range (Royal Society, 2002; Marshall et al., 2005; Danesi et al., 2003). Biodistribution and absorption studies have indicated that U[43] accumulates in the bone (66%), liver (16%), kidney (8%), reproductive system, brain and lung. PAHs are usually quickly eliminated from the body, however, some may store in fatty tissues. DU can also be transported from the lung to lymph system by macrophages. DU is eliminated from the body through cilia action and urine if inhaled and through the urine and mostly through feces if ingested (Hinden et al, 2005; Marshall et al., 2005; WHO, 2001a).

DU is a radionuclide that mostly emits alpha particles of ionizing radiation (Marshall et al., 2005). The Bier VII report states that “Ionizing radiation has sufficient energy to change the structure of molecules, including DNA, within the cells of the body”. This is a likely cause of carcinogenicity risk from radiation (Beir VII). Estimates of DU radioactivity range between 60 percent and 75 percent of natural U radioactivity, depending upon whether or not daughter radionuclides as well as gamma and beta radiation, as well as free neutrons, are

[43] DU is made up of several isotopes of U

taken fully into account (Hinden et al, 2005; Li, 2008). Inhalation of insoluble DU and PAH is of concern when considering lung cancer and blood cancer risks. This is due to insoluble compounds having a much longer residence time in the lung, and, in the case of DU, localized alpha particle irradiation of lung tissues, and more specifically lung-based macrophages that hold onto these particles for long periods.[44]

The relationship between low level exposure to ionizing radiation and cancer risks has been established based upon human data. The most telling human evidence has come from Japanese atomic bomb survivors: a large cohort size, lengthy follow up and well characterized low-level radiation exposures (Brenner et al., 2003). Based on atomic bomb survivor evidence, the Beir VII report concludes that "the preponderance of information indicates that there will be some risk, even at low doses, although the risk is small…approximately one individual in 100 persons would be expected to develop cancer (solid cancer or leukemia) from a dose of 100 mSv". A recently published cohort study of French U miners (n=5086, 30+yrs follow up) observed a significant elevated risk of kidney cancer (n = 20; SMR = 2.0; 95% CI: 1.22 to 3.09) that was not associated with Ra exposure (Vacquier et al., 2008).[45]

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[44] DU emits relatively low levels of ionizing radiation. For example, DU's radiation dose is merely 0.0005% of Ra-226.

[45] A better population of workers from which to draw are U processing workers since the problem of exposure to other radionuclides is reduced. Based upon the known radiation risk described previously, the weight of evidence suggests some cancer risk from chronic U exposure above background levels, especially for the lung and insoluble DU compounds. IPCS and ACGIH consider U to be a confirmed human carcinogen (ACGIH, 2008, IPCS, 2008).

Epidemiology studies looking at cancer risks in the city of Basrah, Iraq (one hour north of Kuwait), where DU was used heavily, are informative. A few studies in the 1990s indicated dramatic increases in cancers among children in post Gulf War I Iraq (Al-Azzawi, 2006) A well-conducted cancer study by Basrah University medical researchers took place in 2005, about 15 years after Gulf War I (Al-Azzawi, 2006). The study examined women of child-bearing age and controlled for all risk factors. Results indicated a sharp rise in several types of cancer, especially breast cancer, after this war ended. Bidgoli (2010) and Grant (2009) have researched links between airborne PAH releases and the advent of breast cancer. They found there is a likelihood of association between PAH exposures and breast cancer in the population (2009; 2010).

**B. Armed Conflict and Collective Trauma**

Collective trauma is the second mechanism or pathway through which armed conflict adversely affects health (see Figure 2). In his tome *Everything In Its Path*, Kai Erikson developed the notion of Collective Trauma to explain how the entire society is affected by a transformative, often violent, shared event such as armed conflict or acts of war. This type of societal trauma is distinct from the psychological understanding of trauma as a sudden or "shock" event (Erikson 1978). Trauma affects individuals differently depending on many mediating factors. In Figure 1, collective trauma is mediated by vulnerability and resilience factors before psychological distress appears. Anthropologists have studied genocide and ethnic cleansing as traumatic events that have left great blemishes

on the human condition due to systematic killings and deaths (Abramowitz 2005; Helman 2000). Other conflicts are less violent and deemed "low-intensity" (Henry 2006; Helman 2000). Nonetheless, such conflicts may still induce stress and trauma in the population *writ large* due to political instability, ecological disaster, physical/economic hardship, social disruption, emergency migration, and bad sanitary conditions (Henry 2006).

In the first stages of post-conflict life, the population suffers from collective shock and stress (Abramowitz 2005; Helman 2000). Armed conflicts provoke triggers for emotional and physical distress, leaving large numbers of people suffering from post-traumatic stress syndrome (PTSD)[46] (Helman 2000; Henry 2006). Helman expounds on collective suffering in *Culture, Health, and Illness* noting that PTSD is a major indicator of collective trauma following violent conflict. Indeed, other studies have shown that PTSD-affected individuals have higher levels of social alienation and reported lower self-assessed health (Ginzburg et al. 2003; Adams 2005; Salick & Auerbach 2006). PTSD includes long-term symptoms of anxiety, depression, psychosomatic disorders and social dysfunction as well as flashbacks to the referent traumatic event. These flashbacks in individuals often persist even after the conflict has ended (2006).

[46] Here is the medical definition of PTSD according to the DSM IV, “The person has experienced an event that is outside the range of usual human experience and that would be markedly distressing to almost anyone, e.g. serious threat to one's life or physical integrity; serious threat or harm to one's children, spouse or other close relatives and friends; sudden destruction of one's home or community” (APA 2000).

**C. The Role of Resilience and Vulnerability**

As collective trauma builds over time, it creeps into the consciousness of the citizenry (Murer 2009).[47] After disaster hits, it goes without saying that distress is nearly a universal reaction. These reactions can be grouped into twin maladaptive and adaptive reactions to the disaster's stress that evolve as a function of vulnerability and resilience factors. In this project, I focus more on the maladapitve pathway, e.g. mental health issues and alienation, because these concepts have been the stated foci of this study since its inception. Here I wanted to develop the notion of resilience as it is delinated in the literature.[48] How is it that most individuals (85-90%) embark on the recovery process and eventually "spring back" from traumatic events? (Agaibi 2008) Indeed, most affected experience transient dysfunction that is usually followed by a return to pre-disaster levels of functioning.

Resilience has long been thought to be mere a personality trait, however, it has in the past 30 years gained more credence as a concept in physics, mathematics, linguistics and childhood development (Norris 2009). For many people, resilience suggests a notion of strength, flexibility, a set of coping skills, a capacity for mastery, and resumption of normal functioning after excessive stress (Lazarus in Agaibi). However, the potential for an individual's resilience also

[47] In essence, the residual trauma affects the whole population; however, it is still not well-known why trauma only affects certain individuals over others, when exposures are held constant. Also, individuals that relocate out of the area hit by trauma, may "carry" the trauma with them to their new home. Studies of refugee trauma will not be discussed given the earlier mentioned purview.

[48] According to the Oxford English Dictionary, Resilience is "the activity or rebounding or springing back; to rebound; to recoil." "The ability to return to the original position." (Norris 2008)

depends on the lived experience of the affected individual, family, and in many cases, the larger community. There are a plethora of associated resilience factors: genetics, neurobiological, childhood development, type of trauma or stressful life event, personality characteristics, cognitive style, prior history of exposure to stressful events, gender, age, capacity for affect regulation, social support and ego defenses (Southwick, Wilson, Zuckerman 1999 in Agaibi). Researchers have shown that the single most important factor to encourage resilience is social support (Norris 2008).

Beyond resilience, other possible post-disaster trajectories include: resistance (no dysfunction), recovery (adaptation more slowly than resilience), and chronic dysfunction (the absence of resistance, resilience or recovery) (Bonnano 2010). Although resistance is the hypothetical ideal, the best possible outcome of mass trauma intervention is not always resistance, nor is it always resilience.

One issue that tends to help expedite or impede an individual's recovery is access to information and communication--they are the main community resources that encourage safety and perceptions of safety. In communities where these resources are poor, unreliable or untrustworthy, this perceived lack of adequate communication may be detrimental to helping the community heal its psychological wounds in the post-disaster area.

For these reasons, we can better understand the affect of vulnerability and resilience factors on the advent of post-traumatic stress (Figure 2). Other projects on traumatic events have developed conceptual models around such

adaptive and maladaptive factors, such as war-zone stressors, pre-war risk factors, stressful life events, social support and alienation (Dekel 2010; Gotham and Campanella 2011; King et al 1998; King et al 1999). If an individual in the community shows post-traumatic symptoms, it depends primarily on these factors.

Figure 2 below illustrates the various pathways of adaptive functioning in individuals before and after an acute traumatic event—such as the Gulf War. Pathways A-C represent forms of resilience while D and E are maladaptive pathways (Masten and Narayan 2012). Trauma has been thought to affect individuals in different ways, with most surviving the event manifesting few, if any, long-term mental health symptoms as a result of trauma. In other words, the effects of collective trauma are not necessarily visible at the individual level for many reasons. In this project, given the focus on negative outcomes, such as breast cancer, I am focused primarily on the maladative factors. In the next section I identify the effects of social alienation and other factors.

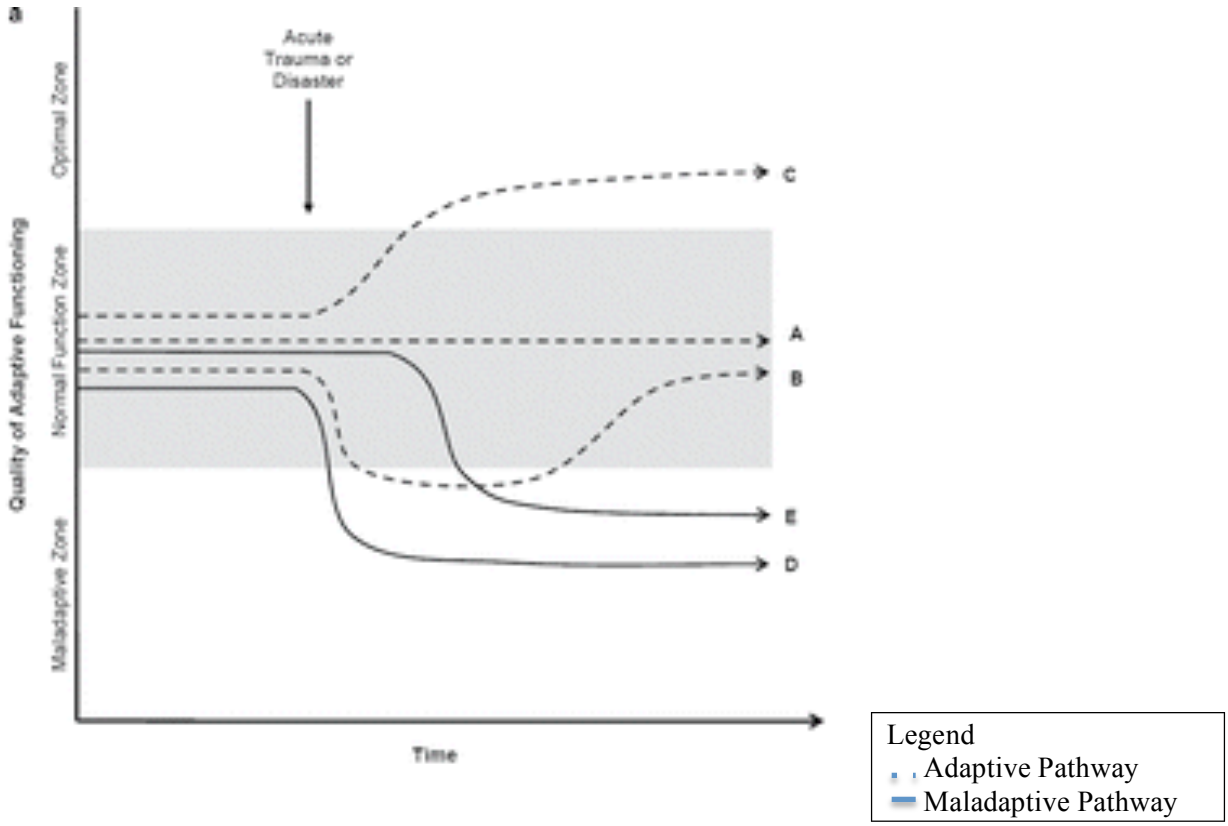


Figure 2. Individual Pathways After Exposure to Trauma or Disaster

**D. Vulnerability in Focus: *Owzla* in Kuwait**

In Figure 1, war-induced collective trauma may increase societal vulnerability on several dimensions. Other studies have shown that PTSD-affected individuals have higher levels of social alienation and reported lower self-assessed health (Ginzburg et al. 2003; Adams 2005; Salick & Auerbach 2006). The concept of *Owzla,* or social alienation in Arabic, is based on the Western notions of social alienation and anomie that were conceived by Marx and Durkheim, respectively to describe the impact of rapid industralization on the workforce that leads to feelings of worthlessness, normlessness, and loneliness (Durkheim 1951; Marx 1964). There have been limited studies done in Arabic on alienation in the Kuwait context (Qinai 1987), allowing for a new perspective for

psycho-cultural anthropologists. Just as industrialization may cause alienation in modern society, Figure 1 posits that war-induced collective trauma may contribute to higher levels of alienation on an individual and societal level.

One war-related factor that leads to individual-level alienation, specifically for Kuwait, is physical vulnerability (Pepin-Wakefield 2008). As a city-state between Iran and Iraq, Kuwait is unable to defend itself and remains dependent on the US for military support (Hoskins 1997). As described earlier, Kuwait finds itself at the epicenter of a tempestuous geopolitical climate where the notion of political stability is fleeting. In fact, there is a persistent feeling among many Kuwaitis that their country could be invaded at any time (Figure 1) (Dinkha 2008). Thus, Kuwaitis live in a constant state of insecurity, are on high alert, and are ready to evacuate whenever necessary (Casey 2007); maintaining homes in Beirut and Cairo is considered quite normal, according to one college student:

> There's always that fear that anything is going to happen. What we are experiencing now is a very comfortable life compared to other countries. It could go away at any time (Pepin-Wakefield, 2008).

These feelings of insecurity are also internalized at an individual level, with high risk of "the destruction of the social self" (Henry 2006). Psychocultural anthropologist Conerly Casey, who has conducted some fieldwork in Kuwait, observed that there is a general sense of hopelessness, emptiness (i.e. symptoms of alienation)—and in some cases, a total lack of ambition, as a result of the perception of recurrent vulnerability in Kuwait's future (Casey 2007; Dinkha 2008). These strong psychological sequelae may act as catalysts for chronic

illness.[49,50] The great depth of recent Kuwaiti history has yet to be thoroughly excavated; most notably, the impact of mass immigration on civil society and public policy.[51,52] However, with large amounts of immigrants, comes feelings of xenophobia and distrust of others in Kuwaitis.

Some behaviors, such as membership in groups or cooperating with others, or attitudes, like trusting government or expectations of reciprocity, are expected to decrease after war (Sidel & Levy 1997). In the model (Figure 1), individual behavior plays an important role as identified by Andersen (1995). However, what is less obvious are the reasons why certain individuals adopt anti-social behaviors: addictions, partner violence, aggression, promiscuous sex, etc. (Adams 2005, *Statistical Abstracts for Kuwait* 2006). In sum, these behaviors often lead to negative health outcomes, either to the individual or his/her intimates. In this regard, we can expect trauma to remain an issue in Kuwait into the foreseeable future (Casey 2007; Dinkha 2008).

In terms of quality of life, it is impossible to enumerate all of the alienation and collective trauma-related impacts from war. For more information on some societal impacts, please see the Appendix. It is possible, however, to witness the

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[49] I will focus on PTSD here; chronic illness will be treated in later chapters.

[50] A common adage in the Gulf, "Dubai is the Kuwait of yesteryear, and Qatar, the Dubai of tomorrow," jostles the Kuwaiti psyche. Although Kuwait was considered a fertile ground for business in the 1970s and 1980s (Mouawdad 2005), Kuwaitis risk losing their grip in their nation's vested interests. Leaders are surely aware that the growing health problems are increasingly inhibiting the State's ability to flourish, both economically and culturally.

[51] Immigrants make up 2/3 of Kuwait's reported population (Osella 2011).

[52] Due to the on-going need for specialized professionals, Kuwait invites individuals from South Asia, the Philippines and other Arab countries to work in numerous sectors such as health, communications and construction. Salaries are often slightly better for the workers than in their home country[52] as well as the offer of free housing and meals. Many Arab nationals arrive from Egypt, Syria, Lebanon, and even North Africa, and recognize the convenience of living in another more affluent Arab state (MoI 2006).[52]

interconnecting effect on the individual between individual characteristics, the collective trauma and environmental exposures (see Fig. 2). Given that there are no individual-level diagnoses of Collective Trauma, PTSD at the community level is a major indicator of collective trauma and how it influences physical health outcomes at the individual level.[53][54] The long-term effects of stressful life events, including traumatic events, are discussed in the next section.

**E. Psychological Distress and Biological Alterations**

Certain life events cause extreme stress and in some cases, trauma: death, partner separation, armed conflict, rape, and many others. The impact of these events on the individual is also dependent on his or her ability to cope with the situation, including one's access to a strong social support network as seen in Figure 1 under individual characteristics (Geyer 1991). This ability to cope may further impact the endocrine, immune and nervous systems either directly or indirectly. Breast cancer is one particular condition that shows a link between chronic stress accumulation and carcinogenesis (Jacobs 2000; Thaker 2006). A focus on breast cancer underscores the impact of stress on hormonally sensitive areas of the body. Stress is an active force in activating the endocrine system that regulates the mammary glands (Andersen 1994). In other words, the

[53] After the events of 9/11, we witnessed a stark increase in PTSD in NYC, on a national basis, only in certain ethnic groups, who were mostly white, young, and female. Another study found that whites were both more likely to seek out treatment and more likely to use medications than their African-American or Hispanic counterparts

[54] PTSD is still a persistent problem in the US, with new estimates of Vietnam veterans suffering from PTSD at 470,000 individuals (Roberts 1988). In this regard, we can expect PTSD and low self-efficacy to remain an issue in Kuwait into the foreseeable future (Casey 2007; Dinkha 2008).

breasts represent a critical site where hormonal imbalances are commonly expressed (e.g. abnormal cysts).

Stress, including psychotraumatic stress, is a common risk factor for many illnesses, including breast cancer. Yet, the pathways by which stress induces illness remain unclear (see Figure 2), and it is difficult to measure the impact of these intense episodes of stresses. In this model, posttraumatic stress causes an imbalance in biological functioning, and leads to biological alterations. Under normal circumstances, the body reacts, adapts and promotes homeostasis even under such episodes (McEwen 1998; 1999). Biologist Bruce McEwen has monitored the accumulation of excessive stress (i.e. psychological distress) and the resulting biological alterations, often in the form of disease (ibid 1998; 2000). This accumulation of stress in the body is called allostasis.[55] The effect of a certain amount of stress on the body is called allostatic load.

McEwen believes that the brain is a main target of stress in the body (ibid 1998). Repeated incidents of stress impact brain function, especially in the hippocampus, where high levels of receptors of adrenal steroids control memory, including the memory of context. Stress regulation also occurs in the hippocampus and exerts a largely inhibitory effect. The toll of adaptation may be pathophysiological and is known as "allostatic load" (ibid 1999; Sterling & Fyer 1988). Allostatic load[56] manifests when the body's homostatic systems are either

[55] Allostasis is the process by which bodily systems, such as the autonomic nervous system, promote adaptation when the body faces a stressful event.

[56] There are three types of allostatic load:
1. *Frequent stress:* the frequency and intensity of stressful events determines how much allostatic load is accumulated. Post-traumatic stress disorder (PTSD) is an example of how an

overburdened or are unable to shut off once the stressful event has ended. Other bodily systems may then be forced to overcompensate for the excess stress levels.

With allostasis, McEwen is essentially portraying an imbalance in the body's adaptive systems (ibid 1998; 2000). If these adaptive systems do not respond well to stressors, the body's other active systems become stressed since they are not counter-regulated. These failures lead to system damage and possible pathological conditions. Inflammatory cytokines[57] are examples of such a system that is normally counter-regulated by adrenal steroids (ibid 1999). Separation or loss of a family member, lover or close friend, and other intensely stressful life events are known to temporarily impair the immune system in many individuals as well. The body is more susceptible to stress impacts, particularly with immune system senescence, and in some cases, disease in later life.

Extrapolating from McEwen's research into the immunological details of the Delayed-Type Hypersensitivity (DTH) response, I believe the mechanism involving acute stress enhancement of DTH responses is one of the underlying pathways for the development of disease, such as breast cancer (McEwen 1996,

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acute traumatic event leads to an inadequately responding hypothalamic-pituitary-adrenal (HPA) axis.
2. *Failed shut-down:* chronic activity and inability to "turn off." Consistently high blood pressure and glucocorticoids encourage obesity and diabetes.
3. *Inadequate response*: a failure to deal with or mitigate stressors to the proper function of the body. To this end, inadequate endogenous glucocorticoids response is associated with autoimmunity and inflammation (McEwen 1998).

[57] Inflammatory cytokines are part of the immune regulatory response that either increases or decreases inflammation in the body (Opal 2000).

1998). DTH reactions[58] are antigen-specific, cell-mediated immune responses that intercede beneficial (for example, resistance to viruses, tumors, etc) or harmful (allergic dermatitis, autoimmunity) aspects of immune function (McEwen 1996, 1997).

There is a certain optimal level of glucocorticoids that is necessary to keep the immune system in balance. If the glucocorticoids do not reach this level, then the body is more vulnerable to the advent of illness. Butow et al. identified two studies--Chen and Geyer--that used the Life Events and Difficulties Schedule (LEDS) which relied on an interview-based method (Butow 2000). Both studies also had adequate samples and statistical analyses while controlling for several confounding factors (Chen 1995; Geyer 1991). These studies examine the complex intersection between the immunological, endocrine, and nervous systems. Indeed, it appears that stress, especially extreme, repeated stress, disturbs numerous areas of the immune system. Once damaged, the immune system leaves certain cells vulnerable to malignant growths (Janeway 2001; Teicher 2007).

As a result, psychosocial-related stress may potentially play a greater role in cancer of the breast than at other sites and is a major reason it is of interest in the present study. Chen et al employed a case-control strategy to measure the

[58]Cutaneous DTH reactions are initiated when CD4 memory T cells are activated by Langerhans cells and other antigen-presenting cells in the skin. The DTH response represents a cumulative measure of allostatic load as reflected in the breakdown of an important arm of the immune response, i.e., cell-mediated immunity (CMI). The specific endocrine and immunologic mechanisms that facilitate this breakdown are presently under investigation.

association between past life events and the development of breast cancer (Chen 1995). They administered a standardized life events interview and rating scale (ibid). The first group was comprised of women recalled for screening mammography with imminent biopsy. The second group was comprised of women with symptoms of breast cancer awaiting the results of a biopsy in an outpatient clinic (ibid).[59] After adjusting for age, and menopause and other potential confounders, the ratio was determined to be 11.6.[60] The researchers also discovered that coping with the stress of these events impacted the patients as well. In his article on women and stress, Geyer (1991) found an association between the advent of breast cancer and experiencing severe life events. His life event variable is an aggregation of three elements: long term contextual threat, loss and threat of identity (Geyer 1991).[61] Evidence also suggests that there is a relatively strong interactive effect between severe life events and family history of breast cancer (Chen 1995; Geyer 1991).

In a study by Palesh et al., the researchers sorted through retrospective reports of past traumatic life events were assessed in 94 women with metastatic or recurrent breast cancer (Palesh 2007).[62] They discovered 42% of the women in the sample had experienced one or more traumatic events (ibid). A history of

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[59] The mean age was 52 years old, with most of the participants being married and employed. In Chen's methods, they employed a semi-structured interview (LEDS) on discrete events and ongoing long-term life difficulties.
The exact date of an event or difficulty was queried and recording during the interview. The threat of each life event was rated on a four point scale. The authors note that they screened for events and difficulties logically independent of the effects of breast cancer.

[60] In their conclusions, Chen et al. found that severe life conditions increased the risk of breast cancer with an odds ratio of 3.2 (95% CI: 1.35-7.6).

[61] He also found that low social support was a vulnerability factor that may aggravate the impact of said life events (Geyer 1991).

[62] A traumatic event assessment was carried out using the event-screening question from the PTSD module of the Structured Clinical Interview for the DSM-IV-TR (SCID 2002).

stressful or traumatic life events was believed to thwart the patient's resistance to tumor growth. These findings are consistent with a possible long-lasting effect of previous life stress on stress response systems such as the hypothalamic-pituitary-adrenal (HPA) axis.

How does stress and physical risk factors impact breast cancer risk? According to Grossarth-Maticek and Eysenck, there is ample evidence of a psycho-physical synergistic effect of these factors in the causation of breast cancer. Their premise is that psychological and physical factors interact in a synergistic way (Grossarth-Maticek 1999). Grossarth-Maticek has the distinction of being the only scale of anti-emotionality out of 11 scales that successfully predicted breast cancer in a sample of 8,000 healthy women. In their findings, they found that breast cancer appeared almost five-fold more in the stress group than in the no-stress group (Grossarth-Maticek 1999). Breast cancer diagnosis may be a life changing, even traumatic event for affected women. For this reason, they also included a screening group that served as a proxy to measure the effects of the diagnosis before and after. This element is also included in the present study as well.

Furthermore, like Geyer, they found that women with a family history of breast cancer and stress had an addititive effect of 9.7% more than women without stress or family history (Geyer 1991). In other words, it is not a question of whether stress causes cancer or not, but, rather, the amount of intense stress and what conditions are necessary to spur carcinogenesis (Geyer 1991).[63]

[63] The authors are alluding to both environmental and genetic factors.

From McEwen to Chen to Grossarth-Maticek, it is possible to observe the pathways by which an individual's stress load accumulates and makes him or her more susceptible to the development of cancer. In the studies cited above, the empirical evidence suggests that serious life events, such as the loss of a partner or a natural disaster, may trigger a stress cascade wherein the individual is much more likely to experience a bout of cancer than in those individuals who do not live through analogous events (Chen 1995; McEwen 1999; Grossack-Maticek 1999).

**F. Is PTSD Associated with Cancer?**

This question was not easy to answer when I started searching for PTSD and physical illnesses, but quickly discovered that this is a rather neglected field of research.[64] PTSD, as a particularly "virulent" type of stress, may be more likely to induce permanent bodily harm (Yehuda 1994, 1999). In Figure 1, there is a line between posttraumic stress and health outcomes, with biological alterations as a mediating factor.

Most researchers in this field are now focusing on posttraumatic stress *post-diagnosis*, i.e. the time after the diagnosis and treatment of cancer. On the contrary, I am concerned with *pre-diagnosis* trauma.[65] Admittedly, this type of trauma is difficult to measure retroactively as well as separately from trauma that develops as a consequence of the cancer diagnosis itself (*post-diagnosis*

[64] I documented spending 4 hours conducting searches on Pubmed and WorldCat with few results—much of the current literature focuses on *post-diagnosis* trauma.
[65] I.e. trauma that is related to the prior event, and not the disease diagnosis itself.

trauma). In an exhaustive review of the literature, Qureshi et al. found that there were very few studies investigating the relationship between PTSD and physical disorders (e.g. arthritis, ulcers). The authors were surprised that there were not more studies "given the clinical lore" (Qureshi et al 2009). There is more literature linking traumas or extreme stress to other non-cancerous, physical symptoms or illness (e.g. diabetes, heart disease).

There is limited emerging evidence that immigrants and traumatized individuals[66] have increased prevalence of medical disease. In a 2008 study, Kinzie et al. examined diabetes prevalence in 459 Vietnamese, Cambodian, Somali, and Bosnian refugee psychiatric patients (Kinzie 2008). The prevalence of diabetes was 15.5%, significantly higher than the US norms. Diabetes was particularly higher in the high-trauma versus low-trauma groups (Kinzie 2008). Immigrant status, presence of psychiatric disorder, history of psychological trauma, and obesity probably all contributed to the high rate.

Hamer et al. employed a meta-analysis focusing only on prospective studies on psychological distress--depression, anxiety, and poor quality of life. These stressors were associated with a 13% increase in the risk of cancer incidence and a 27% increase in the risk of cancer mortality. Interestingly, their study design included some participants with a cancer history.

In a 2004 review article, Joseph Boscarino, a leading American expert on PTSD and social effects, did not find any significant associations between PTSD and adverse physical illness. The most useful aspect was a causal diagram that

[66] Individuals who experienced a traumatic event

explicates how shared environment, health status, trauma, behavior,[67] and biological alterations influence the individual's health status (Figure 3). Boscarino's Heredity and Shared Environment are represented by the Compositional Elements in my conceptual model while the Trauma Exposure can be conceived as the Gulf War in Figure 1.

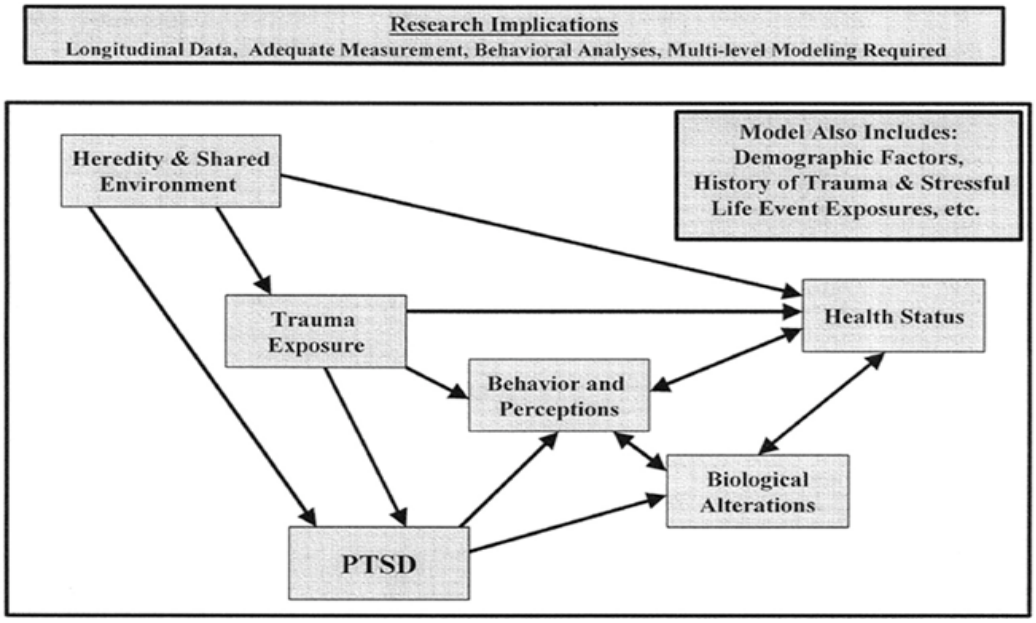

Figure 3. Connections between Behavior, Biological Alterations and PTSD (Boscarino 2005)

Another study by Norman et al. deaggregated patient traumas into three groupings: any trauma, sexual and assault. The patients (N=680) were recruited from university-affiliated primary care clinics in Seattle (i.e. UW) and southern California. They found that there were higher rates of diabetes among men in the *any trauma* cohort (OR 4.8; 1.1-20.9), higher cancer rates among women in the *sexual trauma* cohort (OR 5.2; 1.3-20.9), and higher diabetes among men in the assault trauma cohort (OR 3.3; 1.4-8.2). The study concluded that PTSD

[67] I.e. individual behavior as appears in Figure 1

mediates the relationship between trauma and physical illness. Dobie et al. published one of the first reports documenting PTSD screening in female Veteran Administration patients that found higher rates of cervical cancer in female veterans than women who did not present PTSD symptoms. In self-reported medical problems, women veterans presented with post-traumatic stress disorder (PTSD) symptoms were almost twice as likely to present cervical cancer as well (Dobie 2004).[68]

In sum, based on the literature, there appears to be a weak association between experiencing traumatic events and developing cancer. In particular, the more stressful, traumatic events led to more aggressive cancers, suggesting a synergistic effect between stress and other carcinogenetic factors.

**G. Trauma in Kuwaiti individuals**

Although there are many psychosocial consequences of the Gulf War, one of the most pervasive is PTSD, as observed in Figure 2 (Hammadi 2008). During the post-conflict period, several research projects were carried out on the psychological impacts on adults in Kuwait. One study, based on a random sample of the population collected in 1992, observed that 44% of the studied population had symptoms in the scale suggestive of PTSD, whereas 55% of this

[68] Other investigators have also reported significant functional disability among the women seen for care in VA facilities. For example, mental health may be linked to combat service and diabetes. Seattle VA's Boyko et al launched a prospective study using surveys with the Millennium Cohort. Their questionnaire collected demographics, height, weight, lifestyle, length of military service, diabetes, and other health conditions. They found that individuals reported higher rates of diabetes at follow-up in individuals suffering from PTSD at baseline (OR 2.0). In another study, Scott-Tilley et al determined that women diagnosed with PTSD after intimate partner violence had higher rates of several psychiatric an physical symptoms, including increased rates of diabetes.

population scored high for total depression and anxiety symptoms (Al-Hammadi 1995). Two years after the war, a screening study was conducted at Al-Riqqae Center in which a total screening of the entire Kuwaiti population was studied. It was observed that 27.1% of the population at that time had symptoms fulfilling the criteria of PTSD using three different rating scales: Hopkins check list-15, Impact of event scale, and Ciba-Giegy scale (ibid 1995). In terms of impacts on specific subpopulations, the families of martyrs scored the highest, then the families of POWs and detainees, and then the injured families (Al-Hammadi 1995).

*Trauma in Children*

Another study on 2,700 Kuwaiti school children conducted in 1992 found that 48.1% had PTSD to a mild degree, 40.6% had PTSD to a moderate degree, 11.3% had severe PTSD (Al-Hammadi 1995). In this sample, the younger the child, the more severe the degree of PTSD observed from which they suffered. In the 11-17 year old age group, milder forms of PTSD were more prominent in boys and the moderate and severe forms in the girls (1995). Overall, the Riqqae group found 16% of the total population at the time suffered from symptoms that meet the criteria for a PTSD diagnosis. Other issues that emerged included children were expected to be more self-independent (40%); tightly bonded relations with parents were avoided; and the trauma affected the social and psychological health of the child (28.8%) (Behbehani in Al-Hammadi 1995) Volunteer work was highly encouraged and increased in the post-conflict period. Lastly, rape victims still suffered from PTSD and other psychosocial issues due

to the fact that treatment screening and treatment remained meager during and in the period immediately following the war.[69]

In particular, children in Kuwait may suffer from disproportional amounts of trauma (Dinkha 2008). If children, dependent on structure and rhythm, totally lose their sense of normality (e.g., they witness their friends kidnapped, sequestered, or even tortured), these dramatized events get carved into their long-term memories (Hoskins 1997). More explicitly, these children may no longer know who is friend or foe, breeding mistrust of outsiders. According to a child psychologist expert team sent into the region in August 1991, two-thirds of children did not believe that they would survive to become adults post-conflict (Hoskins 1997). The level of stress and pathological behavior was the highest ever recorded by researchers in over 10 years of experience on PTSD-related issues in post-war countries (ibid 1997). These wartime children, are now Kuwaiti adults suffering from depression and anxiety disorders (Casey 2007 & Dinkha 2008), at a higher rate than their culturally-similar neighbors. Given that this study relies on life course approach, early insults on children will most likely affect adults. Children expect parents to keep them safe, so if children and their parents lose trust in each other, and social cohesion erodes; children start to rely only on limited social networks, causing social alienation (Turner 2003).

[69] Treatment for these psychological health issues was provided in two main institutions in the period immediately after the war. Rehabilitations of nationals, research, training and documentation for psychologists and social workers was offered by the Social Development Office and the Martyrs Office within the Amiri Diwan (Al-Hammadi 1995). The Ministry of Health offered larger programs promoting screening for post-conflict mental health consequence as well as documentation (e.g. registries) and public educations in various media outlets (Al-Hammadi :357-370).

Similarly, this increase in alienation expressed as quotidian occurrences (e.g. national identity and dress) may be witnessed. As a consequence, it is believed that Kuwaiti citizens demonstrate loss of self-control in everyday life and adopt more reckless and anarchic behaviors (Casey 2007; Cange 2009).

**The Research Questions**

Based on the review of the past two chapters, here are the main research questions for each of the empirical chapters:

Chapter 5:

1. After a suitable latency period, will the rate of increase of pollutant-related cancers be higher at the start of the post-latency period in Kuwait than in Jordan and Oman which did not experience the Gulf War?
2. Will breast cancer (BC) rates among women be increasing at a faster rate in the post-latent period than other cancers in Kuwait controlling for the cancer rates in other Middle Eastern countries that did not experience the Gulf War

Chapter 6:

1. Are women who have lived in Kuwait during, or in the period immediately after, the Gulf War more likely to develop BC than their peers who did not live in Kuwait during this period?
2. Are female patients who report more stressful life events, trauma and/or alienation more likely to have BC than women who do not?
3. Are female patients in the BC screening group more likely to report

certain personal characteristics (e.g. divorce, higher BMI) compared to women in the control group receiving usual care?

Chapter 7:

1. Does the Kuwaiti community believes that there are psychosocial (e.g. trauma, alienation) and chemical factors that influenced and/or exacerbated the advent of breast cancer in post-war Kuwait?
2. Does the same community believe that the State controls information regarding cancer risks?

In sum I would like to remind the reader that I have established a framework for post-conflict health assessment around the concepts engaging compositional and contextual factors such as environmental exposures, armed conflict, social transformation and collective trauma. This framework motivates the project's research question and defines key concepts in order to conduct research on this topic. The syngestic relationship between the stress and environmental pollution pathways is a relatively new one, and this chapter has integrated a large number of critical sources. These sources have acted as trailblazers by collecting empirical evidence that further substantiates this synergy's effect on breast cancer, and in this case, in post-conflict societies.

**Appendix, Chapter 3**

Without the proper social context, individuals feel powerless in making connections and working toward a common goal. As most Kuwaitis are working in the public sector, often in monotonous posts with short working hours, they have at their disposition a copious amount of free time (Fikri 2008). Similarly, they may feel like they are underemployed, having received degrees from universities in the West, and working a job with little personal rewards. In the workplace, Kuwaitis may lack a clear role and face psychological strain, with little room to move up the ladder to management positions. At best, they will receive a lateral promotion during their 25 year career as most Kuwaitis retire by 50 with a generous pension; individuals usually started their jobs in ministries at 25 (Cange 2007).

No matter how well-educated or how many life skills Kuwaitis acquire, "control" in the general sense remains elusive in many Arab countries (Casey 2007; Dinkha 2008).[70] Religion and autocratic governments unilaterally regulate many aspects of daily life, leaving the individual less powerful (Casey 2007; Dinkha 2008). Consequently, a Kuwaiti's health may not receive proper attention (e.g. obesity) or, on the contrary, may pay too much attention to it (Casey 2007; Dinkha 2008). A similar artefact was raised in Chapter 1 where I highlighted the hygiene mandates imposed by the French colonial powers in 19th century Egypt.

[70] Here I mean locus of control.

# Chapter 4

## Field Research Methods on the Health Impacts of the Persian Gulf War

Defining risk is an exercise in power-- Paul Slovic

In this chapter I will explain the fieldwork context that I encountered in order to procure data for Chapters 5, 6 and 7. These data include population-based statistics on cancer and other illnesses; a survey in hospital with cancer patients and interviews with individuals on a one-by-one basis. For the first two elements I had assumed that I would need proper permission—but I had no idea of the amount of difficulty and resistance I would face over the following two and and half years. Although this chapter perhaps would not normally appear in a predominantly quantitatively-oriented thesis, it is important in this project because Kuwait is a post-conflict country and there is a certain level of distrust among Kuwaitis (Cange 2009). Especially in dealing with outsiders, there is a high level of distrust, perhaps as a result of the Gulf War, but also as an artifact of Kuwaiti traditions and as a small city-state that is surrounded by rather hostile neighbors. Beyond issues of trust, I highlight in the following text key challenges for the novice researcher in Kuwait and ways to overcome them. Lastly I propose my own concrete research protocol that proved effective to carry out this study in its entirety.

Restraints on access and research also impede conventional routes of access. Obtaining access to research sites in Kuwait, and by extension to data sources, required tireless efforts and patience to assure that a project reaches its

completion. More often than not, a researcher faces a multitude of obstacles over the course of his or her investigation. This next section delves into the reasons for these obstacles before access is truly granted.

## I. Doing Research in a Gulf Pharmacracy

As Szasz defines, most modern welfare states are "pharmacracies" in which medicine becomes a vehicle for State policy—rather removed from its primary purpose to provide services and heal diseased individuals (Szasz 2001). In contrast, for more privatized systems, the medical sector dutifully follows market forces, and turns patient care into a profit-making enterprise with its own set of bioethical consequences.[71]

In his essay The Therapeutic State, Szasz posits that as medical issues become politicized, the first victims are the patients (2001). In socialized medical systems, doctors quickly relinquish their primary role as healers and revert to agents and enforcers of State policy (2001). This critique is reminiscent of Foucault's writings on French hospitals (Foucault 1977) where he discusses how doctors interact and prescribe treatment to their patients. Foucault's *Birth of the Clinic* described the role of the medical care system and the doctor as an agent who observes, who "watches" over the patient. The patient is thus " seen" by the biomedical system. The health care sector in Kuwait is almost entirely public, with several private hospitals offering care to the more affluent social classes (MoI

[71] E.g. the United States spends twice as much as any other industrialized nation on health care, yet child mortality is one of the lowest, a key indicator of poor, later-life health (Starfield 2005)

2006). All Kuwaitis[72] are entitled to virtually free health care and medicines. The government invests 200 million dollars every year in health care, or $235/per citizen/year.[73] With the reign of the new emir in 2006, Sheikh Sabah al-Ahmad al-Sabah, however, transparency has suffered greatly in ministries and, as a consequence, in everyday life (Hassib 2008).[74] Now many clinicians are reticent to speak openly about their patients and the possible links between their illness and the Gulf War exposures (Hassan 2008).

During the colonial period, Middle East Historian Timothy Mitchell discusses how the governing authorities utilized the health system to further their economic and political goals in Egypt (1988). Indeed health care has been used as a service to control the larger population since modern history. For example, the state imposes birth control or vaccine regimens. Morsy documents her experiences in post-colonial Egypt dealing with obstinate state policies, blatant militarism, heightened international trade and the gender division of labor (Morsy 1990). Morsy cites several examples of PEMA analyses referencing post-colonial remnants in certain nations.[75] Keeping this geopolitical-historical context

[72]To be considered "Kuwaiti," one must be a descendant of a Kuwaiti father. The progeny of a Kuwaiti woman and a foreigner is considered as a "foreigner." Also, many bedouins have been living generations in Kuwait without ID cards or Kuwait passports.

[73]Compare this figure to the reported 7,700 USD per capita spent in the United States, without the assurance of universal, public health care.

[74]For example, freedom of expression and freedom of speech have been reported in the press and among Kuwaitis to be more restricted over the last 6 years since this Sheikh took power.

[75] Other public health analyses have been implemented in other post-colonial contexts with similar transformations: Nancy Scheper-Hughes lived and researched in Northeastern Brazil on risk factors for child survival. From these experiences, she coined the term "the macroparasitism of class exploitation" as the vehicle that generated morbidity and mortality.
Through narrative analyses, she was able to delineate how local health outcomes are reflections of international economic processes (e.g. Rainforest resource exploitation, and subsequent abject poverty in Amazonia) of social production of disease and death (Scheper-Hughes 1994). Moreover, during the colonial period, the governing authorities utilized the health system to further their economic and political goals (Morsy 1993). In recent history, many Arab nations are still grappling with questions of

in mind, I describe in the following sections how my efforts to gain access to governmental sites using formal and informal channels.

## II. Means of Access

### A. Informal versus Formal

Legal socio-cultural anthropologist Brinkley Messick describes the process of Yemeni justice which encourages *muwajaha* for potential legal disputes (Messick 1993). This face-to-face approach encourages officials to meet the public at informal sites using informal procedures. Messick further informs us on the role of the informal versus the formal in Yemeni civil society, giving a textual history from a legal perspective on how those systems develop, and later the significance of their origin and institutionalization (1993).

Systems of informal rites of passage are often overlooked when discussing research access. In the Persian Gulf, most ambulatory medical interaction occurs by informal dialogue with doctors. Here I wish to describe the doctor-patient relationship in Kuwait. Direct accessibility and personal encounters help patients reach real solutions. The common belief in Yemen is that it is easier for a judge to come down to the level of an ordinary man than for an ordinary citizen to “step up” to the judge (Messick 1993: 169). By analogy, it seems plausible that a similar relationship exists between the Kuwaiti doctor and patient. Indeed, the doctor is supposed to make the regular rounds at the hospital

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governance while still operating under colonial modes of production. Kuwait—a rapidly developing country-- and Iraq—a developing nation, for example, are valued primarily for their deep oil reserves as targets to supply America's growing petrochemical dependency (Bloom 1994). The two countries supply nearly 45% of the US demand. Through narrative analyses, Morsy and Scheper-Hughes are able to delineate how local health outcomes are reflections of international processes of social production of disease and death.

with selected patients (*muwajaha khassa*[76]*)* from which he can decipher the right diagnosis (1993: 170). I witnessed firsthand this type of care during my year in Kuwait. Questions related to *who* grants access is an important consideration for this type of research. Once the researcher knows *who*, she or he can proceed to ask his or her research question.

To a foreigner, perhaps the biggest roadblock in conducting research in Arab countries is the level of ambiguity between the necessity to use *the informal* or *the formal*, and under which circumstances. Notwithstanding this ambiguity, I would suggest that *the formal* constitutes having to use "official channels" and reliance on secondary contacts or new contacts to realize one's objective; *the informal* constitutes, on the other hand, using *wasta* and close or relatively close contacts to achieve results. These theories support my hypotheses on Gulf War disease-related taboos and informed my work in the field. Needless to say, there were many questions about the Gulf War when I launched my fieldwork; who is affected, when, in what way?

In a health impact study, the institutional barriers to epidemiological research in developing countries start at the administrative level. The power to make decisions on research programs and carry out those programs influences how investigators are organized and managed. In Kuwait the institutional structure pinpoint its origins to the Egyptian bureaucracy given that Kuwait relied on Egyptian labor when the former established its ministries in the 1960s. This type of bureaucracy is itself a vestige of British colonial management—with

[76]Arabic, face-to-face mediation

multitudinous quantities of red tape wherein researchers confront various roadblocks while trying to document or obtain results (Mitchell 1988). In addition, defining one's institutional allies is also a strategic process that requires careful planning and thorough cost-benefit analysis. Allies include not only other researchers and administrators, but also secretaries, guards, and other assistants. These allies help the research to gain access to various levels within and outside the bureaucracy. I think the level of suspicion I experienced in Kuwait was much higher than I had expected, and indeed higher than in any other country I have lived or visited.[77]

**B. Research Sites**

I was able to establish my Kuwait project by exploring many sites during my two visits, the first in 2007, the second in 2011—meetings, interviews, chatting with individuals in waiting rooms and corridors, but also in restaurants, malls, at the American University of Kuwait and the University of Kuwait. Recent ethnographic studies of Egypt and Iran have emphasized the importance of mobile sites and informal sites (Abu-Lughod 2005; Osanloo 2004). I spent my first two months at Kuwaiti academic libraries, resource centers, government agencies and health-related NGOs, reading the appropriate documentation in order to implement my study. In addition to these physical sites, I pursued connections through friends and colleagues—otherwise informal venues in the clinic, perhaps somewhat removed from both the physical gaze of a doctor, but also ideologically as well. At the same time I remember when I was invited on

[77] I have visited in 30 countries across 4 continents.

the spot to the Dental School's graduation. While it was rather spontaneous, I just happened to be “in the right place at the right time.” The program director had been educated in the States and mentioned that he sympathized with my efforts, having faced much bureaucracy in establishing the dental program a few years prior.

Like the graduation, every Kuwaiti event had a reception with a full snack buffet upon which sat plates of *kofta, kebab, fitayr*,[78] haloumi cheese, olives, radishes and of course a plethora of pastries. I was never formally invited to these gatherings but heard about the events from my colleagues down the hall at the university often only a few minutes before they started. It soon became evident that food played a key role in socialization in Kuwait. Often, even seemingly formal meetings were run in a very informal way. While I was researching at the university, I would be invited to the biweekly seminars at the joint American-Gulf Studies Centers. Despite the formal setting (leather couches, floral arrangements, A/V equipment, buffet), many of the attendees were running in and out, busily taking calls on their mobile phones, some more than four or five times during one 45-minute speech. This setting seemed to be also an extension of the more informal *diwanyyia* where men come to powwow with their friends (Messick 1993).

Another element of doing research in the modern Gulf is male-female separation. Indeed I was limited in my interactions with women unless I went to

[78]These are typical Arab meat and potpie-like dishes.

social events with my Kuwaiti adoptive family.[79] While I had spent time living in Morocco and Egypt, the level of female-male separation in Kuwait was one of the biggest cultural surprises that I had to overcome. It did not, however, present a large quandary for day-to-day research. In some cases, I could sense that the potential participant did not want to fully engage with me because I was of the opposite sex. Occasionally she would have her brother, spouse or father sit between her and me while I interviewed. Contrary to the 1960s and 1970s, when Kuwait was going through a sexual revolution not so different from our own, men and women do not socialize in public nowadays beyond pleasantries (Tretreault 2003). While there exist many venues for potential mixing (e.g. malls, universities, libraries), more and more emphasis is placed on segregation of the sexes per traditional Islamic code[80] and rapidly changing political situation. The Kuwait Ministry of Education was encouraged by Islamic MPs to ensure sex segregation at both public and private schools and university. This law was more strictly enforced during my one-year stay in Kuwait: the cafeterias, classrooms and social spaces became more and more segregated. In seminars held at private universities, instructors are required to teach over 2-feet tall, vertical table barriers[81] that separate men from women so that they cannot gaze at each other during the lecture or discussion.

[79] While in Kuwait I was habitually invited to a good friend's home for Friday lunch, and considered them my "adopted familty" while in country.

[80] The subtext, however, seems to suggest that if women and men mingle, sexual contact is an inevitable consequence. This belief is one that creates paranoia among everyone and makes regular, social contact with female colleagues very difficult, if not impossible.

[81] Also known as "Barriers to Uphold Piety."

## C. On the ground: Exploratory Fieldwork

In 2007 I traveled to Kuwait on a Fulbright Student grant from the US Department of State to investigate the medical risks present in Kuwait as well as ascertain how the State admits or denies their severity and frequency. Once in Kuwait, I explored the medical community, the cornerstone of which were numerous hospitals and clinics. There is a certain level of flexibility and informality in the way a patient comes for his or her appointment in the Kuwaiti hospital; for instance, a specific hour is not assigned. Rather, the patient arrives at the main kiosk and receives a number that is then called from the queued patients at the appropriate medical service.[82] Public hospitals (*mostawsif*) in Kuwait were mostly built in 1960s and 1970s, with a few upgrades since. These institutions are very sterile inside with some artistic murals installed in the main corridors. The busiest space was in the pharmacy where the line-less wait and jockeying for their space, literally piling up in front of the window opening, and their chance to pick up their prescriptions as the doctor ordered.

Although I am not undertaking a formal organizational analysis, I am interested in the functioning of the day-to-day operations of the Kuwaiti administration. During my exploratory Kuwait field research, I spent much time navigating the *bedoucracy* that dominates the various Ministries. Bedoucracy has been defined as "a system of government that is managed based on tribal loyalties and logic"; in the case of Kuwait, it seems more like a sheikocracy

[82] There is a set Ministry schedule from 8am-1pm and 4pm-8pm, but this is not a hard-and-fast rule and many patients just show up at the most convenient time, often between 8-10:30am and 5-7:30pm.

model (Ail 1995). This model "is a product of the interaction of bureaucracy and sheiko-orientations and behaviors" (Ali 1995: 15). Managers apply modern organizational elements (e.g. clear lines of authority, efficiency, civil laws) while respecting traditional norms and customs and this approach is a possible example of confusing issues for an outside researcher (e.g. preference for individuals from influential tribes, *muwahaja*) (Ali 1995).

Next I wish to relay an anecdote from my initial attempt to gain access to the Kuwait Cancer Control Center.

In April 2007 I attended the Kuwait Breast Cancer Conference at the Marina Hotel Center on Gulf Road. A colleague at Kuwait University recommended it by chance. I find it odd, in hindsight, that no one had mentioned it to me at KCCC.

The conference was focused on new surgical techniques, clearly too esoteric (e.g. adjuvant TLR ligands) for me—but I felt it could be a worthwhile occasion to meet and greet experts while connecting with other Kuwaiti professionals. A French doctor, Jean-Pierre Martin[83], coordinated the event, with the logistical support of his wife. They managed to bring invitees from Belgium, France and Switzerland. I introduced myself and asked for their contact details. His wife hurriedly scribbled down his email address.

I was to "get in touch" to discuss my project. A week later I received an email from Dr. Martin proposing a 7:30am meeting after his morning ward rounds.

The morning of the meeting I arrived at the hospital and as instructed, proceeded to the second floor where floor-to-ceiling glass panels looked out to the interior courtyard. I asked for Dr. Martin, and none of the nurses knew where he was. Then they informed me that he was coming back from rounds. Suddenly I saw his all-white hair, his eye distant, and a dazed expression on his face, walking with a few younger Indian residents. He made a gesture at me, as if to say "come over here", and he abruptly turned on his heels and pointed toward his office—sterile, no pictures, and indeed, it appeared like he had just arrived. We

[83] The name has been changed to protect his identity.

sat down and he lost no time in inquiring on my status, my project. Right away he wanted to know with whom I was working at the hospital:

"The epidemiologist, Amini?" remarked Dr. Martin with a certain dose of skepticism, "Oh she's too young, not experienced enough. You know Egyptians, they just tell you what you want to hear. She doesn't know what she's doing. Where did she go to school anyways?

Oh, Dr. Shafika—she's got her kids, forget it, she's too busy."

There was a beat, and suddenly the tone became more severe and he launched into a barrage of questions:

"Do you even know what a thesis is? Have you ever written one before? I don't think you know what you getting yourself into…you should have sought out an advisor in Kuwait before you left France. In my brief stay in Kuwait I think that this was untrue. Does your advisor know what's it's like in Kuwait? You don't know how hard it is here. Nobody is going to help you. You'll get nothing here. NOTHING! You don't know these people. I will see you in one year's time and you will have accomplished nothing. You will have totally failed." It was a strange comment. Of course if he really wanted to help me, he would have recommended someone with whom I could work. A beat passed, then he added almost as an afterthought: We tried to bring my students here and it's always failed, something always went wrong.

I couldn't believe my ears—he was totally grilling me, searing me—trying to cut me down to "student size." Only later did I realized that maybe he felt that I was encroaching on his turf—how could I have when I had never previously met, or let alone heard of, him? I started feeling betrayed: I had approached him as a confidante, a fellow foreigner, as an *ad hoc* advisor—someone who could help launch my project—and instead he wanted to shut me down—by making me feel inferior and grossly incompetent. So I turned the tables:

"Why are you here? Why do you keep coming back?" I inquired as I got up to leave. "That's none of your business," he replied in a sharp and acrimonious tone. "I guess I caught him a bad day," I sighed to myself as I proceeded to the elevator. The doors could not have shut fast enough. It was the least offensive way I could think of to express my disgust with this highly trained healer. As the only oncology surgeon in Kuwait, he was naturally a valuable resource for KCCC, and, moreover, for the whole Ministry of Health.

Once Dr. Martin talked with the KCCC Director, Mr. Al-Darfour,[84] about me, the project and my connections were summarily terminated. Despite several attempts to find other institutional allies at the hospital, only once did I have a real collaborator, Sara Al-Madaqqi.[85] But, alas, Sara was informed that she shouldn't be involved with my project, and in short order, she relented and told me that "she could no longer continue," then hung up the phone on me, leaving no room for discussion or response. Rumors began to circulate that the US Embassy had sent me to KCCC to investigate as an agent of the CIA.[86] It was also felt that I was “getting too close” and I “should watch my step.” The cancer hospital director indicated to the Ministry of Health that I would discover "secrets," and spread this information to the outside world.

As a result of my first research experience in Kuwait, I quickly learned that one was not supposed to just "stop by" and launch his own project—research was almost always initiated from within the institution, often by lucrative contracts, and the personal initiative I was expressing seemed inherently suspicious from the outset because I did not fit the model. Establishing pathways of access became my central challenge as I address in the following sections. I don’t think I did anything that was “out of the ordinary”…as one of my informants confided in me this time: “Charles, you had a very large stroke of bad luck last time…”

[84] His name has been changed to protect his identity.
[85] Her name has been changed to protect her identity.
[86] While CIA agents do indeed operate in Kuwait, to my knowledge, they would not infiltrate hospitals or medical facilities because the agency does not rely on Kuwaiti medical intelligence.

Not only are research protocols oblique in Kuwait, but it is also difficult to build allies—both institutional and non-institutional (read: informal) allies who will facilitate the steps needed to launch a project—indeed, no one wants to be blamed if something goes wrong. Only later would I learn from my informants that KCCC had a reputation for being a "place patients go and never come back from," out of sight, and a veritable "Latin Soap Opera," where everyone stakes out with tooth and nail--a piece of his or her turf (Hassib 2008). As such, everyone is clamoring for a piece of the proverbial administrative pie: helping to decide how things are managed or having to accept the health care system as it has been clumsily orchestrated by the internal bureaucracy and administrations since the 1960s (Al-Saleh; Hassan 2008). Not every appearance meets the eye—and some of the events that were occurring at KCCC seemed to be riddled with uncertainty. Similarly, I heard from several former employees that the flow cytometry lab had been closed over an inter-staff dispute.[87] As such, certain cancers may have been misdiagnosed. Moreover, this situation exposes the gross incompetence and medical risks that pervade daily operations at KCCC (Hassib 2008).

Many friends and colleagues had told me that Kuwaitis were nevertheless eager to support American research and were natural allies (Hassan 2008; Hassib 2008). The head administrator at the Sabah Hospital Complex revealed to me upon our first meeting: “I've been waiting for a research project like this for

[87] Flow cytometry is a laboratory procedure used to diagnose certain blood cancers; without this procedure, the risk of misdiagnosis goes up considerably.

a long time." Often my informants would preface their comments on America and the Gulf War by stating "Kuwait and America have a special friendship." My health project focusing on the Persian Gulf War ("Gulf War") struck a nerve with some informants, and my project came right on the heels of the on-going Iraq War, Abu-Ghraib scandal and an explosion of violence that seized many parts of Iraq-located just one hour north of Kuwait. I sought out the patients' stories as eyewitnesses of the Gulf War incident (this is described later on as patient narratives; I do think most participants were candid and forthcoming with information about their experiences). Many had lived through the oil well fires, and felt compelled to describe their memories and how the war literally transformed their lives because they suffer from substantially worse health.

**D. Writing Against Wasta**

Middle East-focused anthropologist Lila Abu-Lughod documents her ethnographic approach as a part-anthropologic, part-media studies analysis of the role of television in Egyptian everyday life. As she outlines her methods, she mentions the notion of "Writing Against Culture."(Abu-Lughod 2006) In this way, she is referring to a three-part methodology for carrying out ethnographic studies so that *culture*, as "the true object of anthropological inquiry," is not simply a monolithic term to quantify "the other" (Abu-Lughod). Rather, she aspires to examine the multifarious, deeply-layered discourses that emerge from culture.

Abu-Lughod proposes a three-pronged approach for qualitative research methods. The first element is an *emphasis on theory*. In the previous chapter sections, I believe I have carefully proposed a relevant theoretical framework for

this inquiry. Abu-Lughod's second element of “Writing Against Culture” beckons researchers to carefully consider *their connections in the research* site. In fact, *wasta*, “connections” in Arabic, dominates questions of access in Kuwaiti everyday life. As discussed by Kendall in her work in Kuwait in 1991, *wasta* plays an extensive role in determining how access is sought at Kuwait University and indeed, how it is secured for the student researcher (Kendall 1991). Without *wasta*[88], I had to rely on others' good will to assist my project or give me entrée to sites.[89] Many times I was informed that I would need to pursue the “proper channels” (*tariq rismee*) for my research authorizations. However, when I would address these same officials they would stonewall me or re-direct me to another site by invoking the need to undertake an additional process. Rarely, if ever, were these processes written down and published in an open fashion. Once a medical research colleague referred me to a research protocol website. Yet it had not been updated for several years and the forms listed as links were no longer available.[90] Another time in 2011, I was put in touch with a prominent Kuwaiti bioethicist who was vehement about submitting my application “by itself.” In other words, under my name and without a Kuwaiti sponsor. When I started to enquire about this to my contacts, everyone laughed it off as foolish advice: “Without a Kuwaiti partner, *there is no way* your application will even be considered!” As such, the bioethicist advice turned out to be contradictory.

[88] I am not Kuwaiti nor do I have any high-level officials as contacts or friends.

[89] *Wasta* is a veritable deal-maker in Kuwait: it helps individuals secure drivers’ licenses, get promotions, and in some cases, get troublemakers out of jail. In a Harvard study on unpaid diplomatic parking tickets in New York City, Kuwait was found to be the *first country at the greatest risk for corruption* out of all the UN-member countries (Fisman 2006).

[90] From my 2007 fieldwork

Conducting research in Kuwait, one has to be very self-reliant, and always be ready to troubleshoot in difficult situations. Indeed, individual agency is greatly reduced in this collectivist culture. To conduct a project as an outsider or, even worse, as an individual, would be highly frowned upon.

One aspect of conducting research with human participants is preparing and submitting a consent form. In Kuwait, my research assistants and I soon discovered that patients were very reluctant to give written permission before the interview commenced. When we explained the study objectives and showed the participants the university letters, they were more willing to give full and uninhibited consent. These assistants were young Egyptian translators, often already working in the medical field. I recruited them based on their experiences and their language skills. Once hired, I provided a brief orientation and training to each assistant, including a discussion of the main research questions, the research instruments and the importance of obtaining consent for each patient. Also we took extensive notes in Arabic and later had them translated into English. In some cases participants were lost if they declined to continue or if we were seen as asking “too many questions.” We tried to build trust with the participant by showing a willingness to “give back” to the community not unlike CBPR. In essence, getting the proper authorizations also depends on one's trustworthiness and how one is perceived in the community (Messick 1993, Kendall 1991).

Another key aspect of conducting research in Kuwait is obtaining official institutional permission. Indeed securing institutional permission is normally the most time-intensive aspect of research projects in Kuwait. Fortunately, I had already established connections with Kuwait University and American University of Kuwait. The US Embassy in Kuwait also has stated its willingness to help secure additional resources for housing and logistics. These documents were shared with the study participants.

Although a Kuwaiti official may profess that she or he is supportive, it is, in fact, difficult to obtain his or her signature for the necessary forms. Written signatures incite a binding legal commitment, thus officials hesitate to provide it when solicited. As in French administration, a form is not considered truly official until it is properly stamped with the official's seal (e.g. the apostille system). One official document, statistics, however, was readily available in Kuwait. In particular, statistics were introduced to the Egyptian health bureaucracy, and later in Kuwait, by way of the French (Mitchell 1988). Often there were made available after considerable nagging, pleading, soul-searching and begging in half-Arabic, half-English. Mitchell notes that statistics allowed the state to register, count and report on individuals (1988). To this end, birth registrations were initiated as well as individual medical inspections, and in the case of Kuwait's Ministry of Information large national statistical abstracts database, data are tabulated on topics as diverse as the State's revenue and expenditures to the number of windstorms per month (MoI 2006). These statistics are available usually only in paper format, but increasingly by CD.

I aspire to apply the third element of the Lughodian method to the hospital and the Ministry of Health where “actions of individuals...[are] inscribed in their bodies and their words.” (Abu Lughod 2006: 474) In other words, participant narratives, as described earlier, are thus illustrative in recording how life events have influenced one’s health outcomes. Participants provide important empirical evidence in their testimonies. The advantage of these narratives is that it emphasizes the patient’s voice—so important in a society where the individual’s role is rather muted compared to the US-- and underscores the nuances between responses.

I have two vivid images that resonate with me following my visits to the large, labyrinthine health headquarters far-removed from Kuwait City. One, Ministry of Health officials repeatedly pounding on the desk with his meaty fist, demanding a "kitab"[91] or memo, that authorizes my research. A *kitab* was another way of saying, “let’s go the formal route.” Two, my visit to the Ministry of Health to ask for a formal permission only led to more deceptions. While I was trying for over two hours to see Dr. Ali Al-Seif, Assistant Undersecretary for Public Health, he would not even come out to shake my hand.[92] And because his nameplate was on the assistant's desk, and the assistant's office was bigger than any office I had ever occupied or seen for an assistant in the West, I simply assumed that he was Ali Al-Seif. It turns out that Dr. Seif was more like the Wizard of Oz, his image was evoked over and over again in the phone calls

[91] Literally “book” in Arabic

[92] Between men, shaking a guest’s hand is a very standard custom in Kuwait. If I had been Kuwaiti, I would have been quite offended.

placed in my presence, but I never really got the chance to meet him. In the end the assistant referred me back to the hospital director several buildings away without nary an explanation or rationale.

In general, I was able to obtain access to my site—not because I possess *wasta* or any acquired understanding of the Kuwaiti system's inner workings, but rather I employed due diligence in my investigation as well as maintained a policy of guarding sensitive information to myself. Also, in order to be strategic for my research, I often offered my informants additional knowledge about my understanding of the environmental health situation so that they would participate in the study while keeping my focus on the bigger picture, that is to say, how these issues affect the overall well-being of post-war Kuwait.

**III. Overcoming Barriers**

The first three months in Kuwait in 2007 were the most difficult because I had no real contacts. I had arranged a few contacts prior to arrival in country, but many of these contacts did not materialize. Also, I underestimated the ongoing sensitivity of the cancer—war connection. Many individuals believe there is a close association between chronic disease and the oil well fires that occurred in the months after the war ended. As a result, it was more viable to shift gears and focus on diabetes. I was able to secure permission from the Amiri Hospital director and carry out my survey on diabetes there.

One of the big breaks in my project came from my affiliation with American University of Kuwait (AUK).

One day, while I was waiting for a colleague at AUK I literally "bumped into" an English instructor, Mary[93], in the teacher's lounge. Mary had many ideas for my project; she provided an assortment of relevant documents for my research and helped me secure a bevy of interview subjects. Consequently, this contact gave me access to privileged information. Also thanks to her and her daughters--who are well connected to the Kuwaiti political elite—it was easier to establish my project in various settings and ministries. In addition, other professors and staff at AUK have guided my research by introducing me to new concepts, other colleagues and students, all of whom have offered their own insights into the war and the environmental health consequences.

When I returned to Kuwait in 2011, I already had a good grasp of Kuwaiti culture and society. Although I quickly learned that Kuwait was more complicated and culturally conservative than I had anticipated, it was immensely easier to continue my interviewing and data collection in 2011 because I developed a political and cultural acumen and possessed a greater working knowledge of the local traditions and norms.

I gained unbridled confidence from my Kuwaitis participants by explaining my project and its importance for Kuwaiti health and environment. In September 2009, I travelled briefly to Kuwait to keep in touch with my contacts, in a culture where "just showing up" counts for a lot, and email contact is not as reliable as in

[93] Her real name has been changed to protect her privacy.

the US. Creativity and initiative also go a long way, too: I established my own contacts to meet with patients outside of the clinic (i.e. away from the pharmacracy) and discuss their health trajectories in a safe environment. Lastly, being a Fulbright researcher carried a lot of weight with participants. When associates learned that I had received a US cultural fellowship, they were much more willing to engage in conversation around the war and health issues.

## Conclusion

This chapter delineates my exploratory fieldwork *in situ*, including ruminating on the role of sites, means of access, patient explanatory models, and informal versus formal systems. Furthermore, these methods have been instrumental in securing site-specific data for the remaining chapters of my dissertation.[94] In particular, this description of my fieldwork sites explored the challenges—both culturally and logistically—to conducting research in Kuwait including defining the formal vs. informal, finding the research sites, crafting a fieldwork protocol for the project and writing about culture in a *wasta*-based context. Furthermore, it was important to consider postcolonial issues while interacting with state actors. As an American, living in the post 9/11 era and post-Iraq War, there was a lot of remaining tension in Kuwait and among Kuwaitis.

On balance, these approaches will constitute an investigative process to address social disparities in Kuwait health and medicine. The two lasting

94 Chapters 5-7 deal with empirical data analysis.

legacies of the war, toxic environment exposures and collective trauma, have engulfed the consciousness of this affluent, petrol-based city-state. Future studies will help to develop these concerns as we inquire more into the health impacts and possible health-related interventions in post-conflict Kuwait.

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## Chapter 5
## A Comparative Study of Post-Conflict Breast Cancer in Jordan, Oman and Kuwait

### I. Introduction

My dissertation focuses on the 1990-1 Gulf War as a transformative health event and a major risk factor in the reported rise of breast cancer in Kuwait. Most Kuwaits were exposed to toxic chemicals during the 8-month oil well fires of 1991 that directly followed the Gulf War. This study seeks to compare breast and other cancer rates in Kuwait to rates in Kuwait's regional neighbors, Jordan and Oman. My methodology, detailed in Section III: Study Design, is unique because it addresses exposure as pollution from the Gulf War from a socio-cultural perspective[95] while maintaining rigorous epidemiological methods.

This project illustrates that the increase of rates of certain cancers in Kuwait is associated with the post-conflict time period. These war-era chemical exposures were documented in Chapter 1. Using abstract cancer registry data, I document the incidence of cancer in Jordan, Oman, and Kuwait. From these data, ecological epidemiological methods were used to extract meaning and draw comparisons across country-specific cancer rates. The cancer incidence rates should be increasing in Kuwait after a latency period (i.e. 7-10 years) in relation to the other countries (Armitage & Doll 2004). For the leukemia and thyroid latent period, it can be between 5-10 years or less, depending on the intensity of the environmental exposure and development stage at which the exposure occurred (Nikiforov 1994; Gilbert 2010). The latency period literature on Non-Hodgkin's lymphoma (NHL) is much less conclusive with ranges from 2

[95]Socio-cultural: a sociological and cultural basis for the current analysis.

to 60 years (Jameston 2004). Other experts cited 15-20 years depending on the chemical exposure (Guess 1977; Rothman 1981). Colorectal, breast and prostate cancers manifest after similar latency periods (Guess 1977; Rothman 1981). [96]

This project's has two hypotheses: that after a suitable latency period, at the start of the post-latency period the rate of pollutant-related cancers will be higher in Kuwait than in other Middle Eastern countries that did not experience the Gulf War; and second, breast cancer (BC) rates among women will be increasing at a faster rate in the post-latent period than other cancers in Kuwait, controlling for the cancer rates in other Middle Eastern countries that did not experience the Gulf War (Bonner 2008, Crouse 2010). Toxic chemicals from the Iraqi invasion fifteen years ago have been previously associated with increases in childhood cancers in Kuwait (HSPH 2005); children are known to be the most susceptible to wartime exposures[97] (Macksoud 1996, Jones 2003).

In both Kuwait and southern Iraq, leukemia rates have skyrocketed upwards of 400% (MOI 2006).

**II. Importance of Ecological Studies**

Ecological studies are important in epidemiology for several reasons. First, population level studies play an essential part in defining important public health problems and help generate new public health theories. Moreover, some individual level risk factors for disease do not vary enough within populations to

[96] These periods are defined in a later section

[97] Childhood development and susceptibility to chemical and psychological stressors was discussed at length in Chapter 2.

allow their effects to be identified or monitored in individual-level studies (Rothman & Greenland 2008). Epidemiologist Neil Pearce reminds us in "The Ecology Fallacy Strikes Back" that the identification of many of the modern causes of cancer (i.e. dietary factors--colon cancer, hepatitis B--liver cancer, HPV--cervical cancer) have their origins in the "systematic international comparisons of cancer incidence from the 1950s and 1960s" (Pearce 2000). Secondly, it has become increasingly obvious that myriad disease risk factors operate at the population level (Rothman & Greenland 2008). In some cases, they directly cause disease; in others, they act as effect modifiers or are determinants of exposure to individual level risk factors (Rothman & Greenland 2008; Pierce 2000).

**The Problem with Individualistic Fallacy**

Some epidemiologists focus exclusively on individual level exposures to a fault; Pearce identifies the *individualistic fallacy* "…in which the major population determinants of health are ignored and undue attention is focused on individual characteristics" (Pierce 2000). In many contexts, however, individual characteristics exist *within* a population and are influenced by population-based effects--often a stronger determinant of disease incidence (Frohlich & Potvin 2008). Also, ignoring national political and historical contexts by simply studying homogeneous populations may lead to the erroneous conclusion that individual characteristics are the key determinants of disease. Some epidemiologists are thus promoting the usage of multi-level analyses because these analyses weave

together ecological effects and individual level effects (Diez-Roux 2010, Pearce 2000). Multi-level analyses are in fact a merger of the two types of ecological studies: groups and time as they examine both individual and group-level data over time (Greenland & Morgenstern 1989). Much as Diez-Roux is critical of the lack of appropriate metrics for assessing group-level effects (Diez-Roux 2008), there is little scholarship on how to assess the syngeristic effects of war exposures on an entire population (Levy 1997, Arya 2010).

Pearce argues that a proper epidemiological toolkit, with knowledge of ecological methods and data analysis, is "not a substitute for knowing how to choose the most appropriate hypothesis," as well as properly estimating the biological plausibility of a cancer site, such as breast cancer (Pierce 2000). Studying real life public health problems, like war, necessitate examining the historical and social context. In addition, this approach highlights the collective trauma that the population experienced. Yet, such an approach does not preclude employing sophisticated data analysis.

Here, I would like to focus on a country with large-scale pollution. To this end, I examined several studies that focused on international environmentally-associated cancer incidence using ecological designs. A 1994 Finnish study examined drinking water mutagenacity and gastrointestinal and urinary tract cancers employing an ecological study. Koivusalo et al examined past exposure to drinking water mutagenicity in 56 Finnish municipalities using 1955 and1970 as key points in time (Koivusalo 1994). Cases of bladder, kidney, stomach, colon

and rectum cancers were derived for two periods, 1967-1976 and 1977-1986. These two time periods account for a normal latency period during which the cancers would develop. In Koivusalo's subsequent Poisson regression, age, sex, social class, urban living and time period were analyzed, and suggests those risk factors also be considered in this study (Koivusalo 1994). The Finnish researchers found statistically significant exposure-response association for the incidence of bladder, kidney and stomach cancers.[98]

A second ecological study set out to investigate exposure to radioactive iodine from atmospheric nuclear tests in Nevada. Gilbert et al. (2010) discovered that the tests' fallout covered a large geographical area. Based on the author's previous research and released government health studies, it is believed that these tests may have increased thyroid cancer risks.[99] They calculated excess relative risks per gray[100] for exposures received before age 15, by comparing cancer rates among counties receiving varying estimated doses of radioactive iodine after adjusting for age and birth year (Gilbert 2010). The estimated excess relative risk (ERR) per gray (gy) for infants less than 1 year old was 1.8. In other words, for each additional gray of radiation exposure, infant populations in Nevada were almost twice as likely to develop thyroid cancer than the non-exposed group. There was no additional evidence that this estimate declined with

[98]For example, in any given municipality, a 3,000 net rev/L increase in mutagenicity would indicate a relative risk of 1.2 for bladder cancer and of 1.2-1.4 for kidney cancer in periods and places where mutagens were prevalent compared with municipalities where non-mutagenic drinking water was consumed (Koivusalo 1994).

[99]The authors used eight Surveillance, Epidemiology and End Results (SEER) Program tumor registries for 1973-2004.

[100]Gray=The unit of absorbed dose of radiation by a material is denoted as the gray (Gy), one gray being equal to the absorption of one joule of energy by one kilogram of food.

follow-up time or that risk increased with dose received at ages 1-15 (Gilbert 2010). These findings are partially consistent with studies of children exposed to external radiation (I131) from the Chernobyl accident, where no link between exposure and subsequent cancer was found (Gilbert 2010).

One last study of interest in this review was conducted in Modena, Italy, on the carcinogenic effects of a municipal waste incinerator. In this study, Federico et al. carried out a retrospective ecological study to assess cancer incidence between 1991-2005. They identified three parcels of land of increasing distance from the incinerator, and used the residence as a surrogate marker of the exposure (Federico 2010).[101] The SIR calculated for all cancers and the sites did not demonstrate any excess risk in the area next to the incinerator (Federico 2010). Higher SIR for leukemia was identified in the second parcel from the incinerator for females at 1.35 and for both sexes, but no spatial trend was observed (Federico 2010). Thus, the authors deduced that there is no detectable increase of cancer risk for people living in proximity to the incinerator.

Many other strong and weak ecological studies have been published in the literature, examining the effects of solar radiation, nitrates in municipal drinking water and nuclear power plants on cancer incidence. These studies, while inconsistent in their findings, demonstrate the important role that ecological designs play to measure the effects of environmental pollutants in tracking

[101]Residents were associated to the most appropriate census unit. Age-standardized incidence ratios (ASR) and standardized incidence ratios (SIR) were estimated for all cancers and selected sites. These standardizations of metrics need to be kept in mind for the present study, too. The authors devised a deprivation index to correct for possible confounding.

carcinogenesis. Here I will focus on Gulf War exposures, as cited earlier, in the Kuwaiti population versus non-exposed Arab populations in Jordan and Oman.

**Veteran-related Studies**

To examine the influence of stress on carcinogenesis, McCauley examined UK Gulf War veterans who were deployed vs. those who were not 9 years later. She found that among those who were deployed, they were 3 times more likely to self-report cancer than those who were not deployed into the combat theater, though this elevated rate was not statistically significant. PTSD was also 15 times higher in the deployed cohort compared to the non-deployed. (McCauley et al 2002)

While rates of breast cancer were not elevated in this study of UK veterans of the Gulf War, blood cancers and urinary tract cancers were. While the risk of mortality from cancer was not higher in this group, the risk of certain cancers was higher 11 years later. Urinary tract cancers were 30% higher in those who were deployed than the non-deployed. Blood cancers, such as lymphoid and hematopoietics, were 60% higher in the same cohort (Macfarlane et al 2003). In other studies of Gulf War veterans, researchers did not find an association between cancer and exposure to wartime chemicals (OR: 1.00 CI: 069-1.30) (Kang & Bullman 2001).

## III. Study Design

Relying on an ecological study design, this epidemiological project's main aim is to evaluate a possible association between Gulf War exposures and higher civilian cancer rates. Many public health experts believe post-conflict public health impacts originate from small increases in individual risks distributed across populations (HSPH 2005). An ecological study affords the opportunity to examine the global impact of these exposures by comparing changes in Kuwait cancer rates to changes in the rates in unexposed populations in Jordan and Oman.

The study design is a post-test only control group design (Shadish 2002) generally comparing annual cancer rates for 1991-2009 in Kuwait with annual cancer rates in 1996-2008 for Jordan and Oman. Cancer rates in Jordan, upwind from the war's chemical fallout, and Oman, out of reach of the bulk of the smoke plumes, have remained stable from 1991 on (Nimri 2008). As such, Jordan and Oman will serve as reasonable control sites where genetic and other environmental factors are sufficiently similar to Kuwait (KISR 2008).[102] Jordan and Oman are both culturally similar to Kuwait. In terms of population, Jordan is the largest, followed by Oman, and then Kuwait (Table 1). As a consequence, Jordan has the highest cancer incidence among the three nations at nearly 5,000 cases/year. Although Jordan has high expenditures on health care and high adult literacy, similar to Kuwait, it has the highest infant mortality among the

[102] These countries were not selected based on a convenience sample. A more convenient choice would have been Qatar or Bahrain. Both were heavily exposed to Gulf War exposures.

three countries. These two countries are good comparison countries, because, like Kuwait, Oman is an Arab, Gulf country; Jordan has a large Bedouin (nomadic) population. Table 1 presents a synthesis of key health indicators from these populations.

Table 1. *Health Indicators in the Study Populations, 2008*

| Health Indicators | Kuwait | Jordan | Oman |
|---|---|---|---|
| Population, millions | 1* | 6.3 | 3.4 |
| Infant Mortality Rate, per 1000 live births | 9.0 | 17.4 | 16.8 |
| Literacy Rate, % | 93 | 90 | 81 |
| Total health expenditure as % of GDP | 3.9 | 9.5 | 3.4 |
| Life Expectancy, yrs | 77.7 | 79.9 | 74.2 |
| Cancer Incidence, 2008 | 693 | 4,798 | 915 |
| Breast Cancer % of Female Incidence, add year | 40 | 36.8 | 23.1 |
| % Overweight | 33 | 28 | 27 |
| % Carbohydrate in diet | 58 | 63 | 62 |
| % Oral Contraceptives | 50 | 42 | 35 |

*This figure represents the estimated number of Kuwaiti nationals; the nation's total population is 3 million inhabitants.

The primary hypothesis is that, while cancer rates are generally increasing in all three countries, the increase is greater in Kuwait during the appropriate

post-latent periods. The hypothesis tests rely on two main assumptions: one is that there is an increase in cancer rates in the same time periods across countries; and two that the rate difference between Oman and Kuwait and Kuwait and Jordan is constant if there is no effect of conflict on Kuwaiti cancer rates. Since 1991 a modest rate increase would be expected in affluent countries like Kuwait and Oman as a result of better cancer screening programs that detect early invasive cancers.[103] Indeed, some of these cancers would otherwise may have gone unnoticed over time. In this ecology study, data on the incidence of cancer in Jordan and Oman during an 13-year pre- (1996-1997/2002[104]) and post-latent period (1998/2003-2008) were compared with that for the Kuwait population.

Other diseases—nonequivalent dependent variables-- for which increases would not be anticipated in Kuwait -- are measured also as a simple means of comparison (Shadish et al 2002). For this study myocardial infarction was analyzed. If no association indeed exists for myocardial infarction, as it is mostly a genetic disease (Leander 2005), it would imply that the rise in certain cancers may be related to an external event. A positive association would be expected between cancers related to Gulf War exposures and the time since the Gulf War in Kuwait ceased.

[103]Kuwait implemented a national cancer registry in 1973. This registry was active and most cancers were screened for by the war. What does "screened for by the war" mean? Oman started its national registry in 1985.

[104] This variation in dates depends on the cancer site.

## IV. Measures and Data Sources

Temporal patterns in cancer in selected geographic areas were assessed using incidence data from national, population-based registries (Kamangar et al 2006).

Data on the incidence of cancer for persons aged 0-90 years at diagnosis was collected from national cancer registries. Research in Jordan and Oman took place in cooperation with the Ministry of Health in Amman and the Omani Ministry of Health. These data were already procured previously for Kuwait in methods that were thoroughly described in Chapter 4. The following diagnoses were studied given their possible Gulf War etiologies (Table 2): lymphoma, leukemia[105], colorectal, prostate, liver, and breast. Latency periods for each in relation to the Gulf War were considered (Table 2). Lung cancer was not considered because of the confounding between smoking and the development of this cancer. Besides the latency period, as defined in the introduction, the time frame and age are important variables that will be examined next.

[105] For this study, leukemia subsumes acute lymphocytic leukemia (ALL), chronic myeloid leukemia (CML), and acute myeloid leukemia (AML).

Table 2. Cancer Sites and Possible Etiology in Kuwait

| Cancer | Gulf War Etiologic Agent | Mode of transport | Latency Period, yrs |
|---|---|---|---|
| Blood | Oil-based substances in air, Nickel, Vanadium, Ionizing radiation | Air, Food, Water | 5-15 |
| Breast | Oil-based substances in food & air, Nickel, Vanadium | Air, Food | 6-20 |
| Colorectal | Oil-based substances in food | Food | 10-30 |
| Thyroid | Ionizing radiation substances (e.g. DU) | Air | 4-15 |
| Prostate | Nickel, Vanadium | Air, Food, Water | 7-22 |

Source: KISR 2007

**Adjusting for Age**

It is imperative that transnational cancer incidence comparisons be age-adjusted. The country-specific incidence and mortality rates were estimated for 7 different types of cancer by sex, for five broad age groups (0-14, 15-44, 45-54, 55-64, and 65 year and over). To this end, age-standardized incidence rates (ASRs) were collected; these rates take into account the difference in the age structure of the populations being compared utlizing rates per 100,000 person-years. Age-specific cancer incidence rates in 10-year age groups were obtained from the registries cited above. Some of these rates were available in the

published annual reports; other rates were not available and were computed manually (e.g. singular leukemia calculated from subtypes). The level of completeness of registration among Kuwait, Jordan and Oman is similar (e.g. 96, 93, 92%, respectively) since each country's national health service offers the primary delivery of health care to the population and is widely used by the majority of the population (GCCU, 2010; Freedman et al. 2003).

The ASR also recognizes that most cancers manifest in later life, so that populations containing a high proportion of old people will tend to have a higher overall rate than one with mainly young people. The Jordanian population, like many developing nations, is overwhelmingly comprised of youths. Oman and Kuwait have likewise recorded a large increase in the youth demographic group over the past two decades. Statistical power was calculated based on 80% power and 95% confidence interval and with at least data from 15 years for the three countries to assess the analyses with 8 case years and 9 control years. In a previous study the response within each subject group was normally distributed with standard deviation 3.77. As the true difference between the groups' means is 13, we were able to reject the null hypothesis that the population means of the exposed and control groups are equal with a probability of (i.e. power) 1.000. The Type I error probability associated with this test of this null hypothesis is 0.05.

## V. Statistical Analysis

### Rate Ratio

In the preliminary analysis, the three populations were compared by ASRs utlizing rates per 100,000 person-years (Parkin et al 2002). A rate ratio was calculated for this comparison, as defined as "the ratio of two rates, expressed in epidemiology as the ratio of the rate of a health outcome in an exposed population to the rate in the unexposed population" (CDC 2001, Vissler 2005).

The rate ratio is thus captured in the following equation:

$$\text{Rate Ratio (RR)} = (a/N1)/(b/N2)$$

Where "a" is the exposed and "b" is the unexposed and N1 is the person-time of "a" and N2 is the person-time of "b."

In the case of Kuwait, population-based ASR data were calculated by employing this formula for Rate Ratio based on the following 2 x 2 table format using the rate ratio function in STATA:

Table 3. Rate Ratio Function in Arab World Comparison

| | Cases (Outcome) | Person-time |
|---|---|---|
| Exposed (Kuwait) | A | N1 |
| Unexposed (Oman) | B | N2 |
| Unexposed (Jordan) | C | N3 |

These rates were stratified over three time periods in the peri-latent[106] and two periods of the post-latent: 1996-1999; 2000-2003; 2004-2007. So for each stratum, I calculated the ratio using the reported ASR and calculated the denominator by finding the factor of population by year[107] for each country and multiplying it by 100,000 person-years. I used the risk ratio function in STATA to make these calculations and reported the results in Table 4.

**Least-Squares Regression**

A stratified analysis (i.e. rate ratios above) is not sufficient *per se* in this analysis to assess the changes among countries because it tends to de-emphasize or overemphasize certain countries' rates based on their increased absolute counts, for example, Jordan's overall higher frequency of cancers than Kuwait's. Indeed, the analysis described above compares rates between different time periods within each country. In order to compare changes in cancer rates between Kuwait and the control countries, regression analysis was run to assess the difference in the increase in the cancer rates' slopes among the countries. This difference in the slopes is the variable "Tpost"—time at a certain position in time.[108] Thus, a difference in change in cancer rates between countries starting at the end of the latent period of interest can be assessed with the slope going up or down afterwards (Figure 1). In this figure, the dashed line represents the hypothesized rate of cancer A for Kuwait. The flat solid line is the

[106] Peri-latent: during the latent period.
[107] These data came from the census.
[108] For tpost, the variable was coded thus: 1990-latency start date =0, then 1, 2, 3, etc. and if Kuwait, otherwise "0."

rate of cancer A if the war had not occurred.

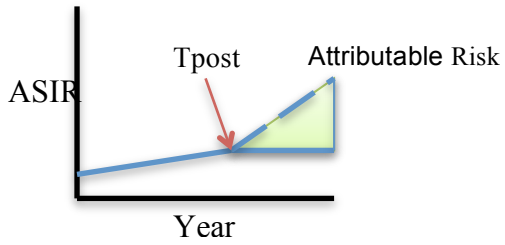



Figure 1. Tpost's Estimate of Attributable Risk

For the distribution of the data (Figure 1), an ordinary linear squares (OLS) regression was chosen because the rate data appeared to be distributed in a linear fashion (Anderson 2010).[109] In this project, we used OLS regression to estimate the effects of the exposure on the rates of cancer in Kuwait: compared to other countries, then by itself (without "country"). For this regression, several variables, as defined earlier, were of interest: time after the war, the latency period of cancer sites selected (7 years, i.e. 1991-1998), sex, and country (Kuwait, Jordan or Oman). After trying to fit the data to several permutations of models, the best fitting model (i.e. statistically significant at $p>0.05$) was found by using a bivariated country variable and fitting it with the interaction of time and the latency period.

For Hypothesis 1: Cancer ASRs= Time after War_Kuwait, Time after War_Oman, Time after War_Jordan + Country + Sex + $\varepsilon$

where Time after War_Kuwait is assigned the values 1, 2, 3 and so on in STATA for each subsequent year after 1990 if the country is Kuwait and 0 for Oman and Jordan; Time after War_Oman = (ibid) if the country is Oman and 0 for Kuwait

and Jordan; Time after War_Jordan= (ibid) if the country is Jordan and 0 for Kuwait and Oman; and Country is a factor variable in STATA (coded 1=Kuwait, 2=Jordan, or 3=Oman).

For Hypothesis 2: Cancer ASRs= Time after War+ Country + tpost_Kuwait+ Sex + $\varepsilon$

where Time after War=1, 2, 3 and so on in STATA from 1991 to 2009; tpost = 0 for 1991 to the post-latency start date and then coded 1, 2, 3 and so on to the end of the post-latency period; and Country was a factor variable in STATA where each country had a value (i.e. Kuwait=1, Jordan=2, Oman=3), and one country was held as the reference (in this case, that country was Oman).

From these calculations, we were able to ascertain the attributable risk. The attributable risk constitutes the extra risk of the occurrence of a particular disease among persons exposed to a risk factor of interest (Szkly & Nieto 2005). This type of risk assessment provides information about the absolute effect of an exposure removal (idem 2005).

For a binary exposure such as war-related exposure versus baseline exposure, attributable risk is defined as:

$$AR_{exp} = I_{exposed} - I_{nonexposed}$$

where $I_{exposed}$ is the incidence in the exposed, and $I_{nonexposed}$ is the incidence in the unexposed populations.

In these figures, the $AR_{exp}$ was the area above the *expected slope* if the war had not occurred (unexposed) subtracted from the portion of Kuwaiti individuals who were exposed (Figure 1). In other words, the portion of the incidence of a disease in the exposed that is due to the exposure. The AR is the incidence of a disease in the exposed that would be eliminated if exposure were eliminated.

As a confirmatory analysis, we relied on cancer registry data and population data from the national census of each country based on the sex of the count data analyzed in a Poisson model. In these models, there is an offset term that quantifies the population that is used to estimate the rate for each event in the model (Anderson 2010, STATA 12.1). In general, the Poisson models, although not age-specific, confirmed the results of the OLS models.

**VII. Results**

In the multinational ASR plots (Figure 2), several important elements are observed. First, there is a marked increase of the rates around 1997, for example in NHL (ASR: 4 to 7 in females (f); 5.8 to 10 in males(m)) and breast (ASR: 32.8 to 38.7). Also, we notice that for certain cancers, such as thyroid (m) and leukemia (m), there is a general trend downward in the ASR slopes for Oman and Jordan that contrast with Kuwait's rising ASRs. For a systematic presentation, below I present the trends cancer-by-cancer, starting with breast cancer.

For breast cancer, the slope of the post-1997 rates for Kuwait at y=1.35x are nearly 20% steeper than the slope for Oman (y=1.12x) and is slightly lower than Jordan's rate (y=1.43x) in the same period.

Although female NHL is trending downwards in Kuwait, the men's rates are trending slightly upwards, if not at the same slope as Oman, even though the absolute values are much higher in Kuwait (Figure 2). In Kuwait male NHL rates spike around 1999.[110] This phenomenon is quite similar for females with peaks between 1998-2005 at 8.7 cases/100,000 person-years. In examining NHL(m) and thyroid(m) rates, the data are distributed in a similar manner between Kuwait and Oman with three synonymous curves (Figure 2). Also for female NHL rates a very similar distribution was observed over time between the same nations with a lag of 2 years in the Oman data from Kuwait's. Conversely, Jordan's female NHL rate is going down to 2.5 cases/100,000 person-years. Jordan's male and female thyroid rates appear to be constant over the this period.

Lastly, in looking at colorectal cancers Kuwait females overall rates have increased at least 50% from 6 to 9.5 higher than rates for this site in the 1990s. Males rates of colorectal cancer, on the other hand, are trending downward in the same period. Colorectal cancers also appear to be rapidly increasing in Jordan especially after 2005.

**Table 4**

Table 4 compares the rate ratios of various cancer sites over time within Kuwait, Jordan and Oman. In comparing various cancer sites for all the countries

[110] The 2008 outliers were most likely due to data entry error.

of interest, the cancer rates increased for certain sites from 1996-2007. The first period is a late latency period—where as evidenced in Figure 1, some rates are already elevated in Kuwait. In particular, the rates are generally trending upward for all countries. In Kuwait, there is a noticeable increase between period 1 and period 3 for breast RR=1.31(95% CI: 1.14-1.50) and female colorectal RR=1.53 (95% CI: 1.32-1.77). For NHL, the male rate decreased from 5.8 to 4.3 cases/100,000 person-years and slightly increased for females RR=1.04[111] (95% CI: 0.78-1.40) when compared to Oman where the ASR increased two-fold over the same time period.

For leukemia, Kuwait's male and female rate doubled between 2003 and 2007 from 3.2 to nearly 8 cases/100,000 person-years for men, 3.5 to 6.2 for women; whereas Oman and Jordan's rates are both steadily decreasing to around 2 cases/100,000 person-years.

**Table 5**

In Table 5, we observe results from linear regression models of registry ASR data for Kuwait, Jordan and Oman during 1996-2009 for various cancer sites where each row in Table 5 presents the regression results for a given cancer. First, the highest intercept ASR is breast at 26.6 (95% CI: 1.04-1.62) and the second highest is 10.4 cases/100,000 person-years for prostate cancer (95% CI: -0.25-0.40). In the pre-latent period, Kuwait's breast cancer was growing at about 1 ASR; in the post-latent it is at 1.33 ASR. Colorectal cancer in Kuwait was increasing about one-half cases/100,000 person-years (95% CI: -

[111]This figure was not statistically significant as evidenced in the CI.

0.03-0.94). Male and female leukemia were increasing at much faster rates in Kuwait than Oman or Jordan, as discussed under Table 4. Male cases were 0.30 ASR for colorectal in Kuwait (95% CI: -0.04-0.65). Colorectal was trending downward for Jordan and Oman, except for Omani men (ASR 0.55 95% CI: 0.10-0.28)—we would expect the rates for these countries to be relatively low if not exposed to Gulf War-related chemicals. NHL, on the other hand, is steadily increasing in Jordan and Oman during this time, particularly for Jordanian females at 0.63 cases/100,000 person-years (95% CI: -0.48-1.74). In Kuwait, NHL rates did not seem to be increasing or decreasing (95% CI: -0.17-0.16). Thyroid cancer was slightly increasing in Kuwait. There was a smaller increase among females of 0.19 ASR observed in both Oman and Jordan in this period.

**Table 6**

In Table 6, we observe results from linear regression models of registry ASR data for Kuwait, Jordan and Oman during the latency period for several sties. For many of the cancer sites, there is a marked increase in cancers by the 2000s--the post-latency period. First, the highest intercept ASR is breast at 27.2 and the second highest is 7.22 for female colorectal.

Table 6 references the effects of the Gulf War on Kuwait cancer sites when compared to a control, and includes data on the ASRs during the latency period. The second column reports the slope for the pre-latency period (1990-1997) for Kuwait (e.g., 0.35 for male leukemia). The third column presents the Post-Latent slope for 2000-2007.

For our research question, the most illustrative variable is Change in Post-latent Rate ("Tpost"). Tpost, the annual rate of change, is increasing for breast and has a statistically significant increasing trend going from 0.99 before 1998 (95% CI: 0.31-1.67) to 1.96 (95% CI: 0.73-3.18) between 1998-2009. Male NHL also is trending upward, yet by a much smaller margin from 0.56 cases/100,000/year (95% CI: 0.16-0.96) to 0.82 in the post-latent period. Most other cancer sites were increasing from the latent to post-latent periods with the exception of female NHL. Kuwaiti female colorectal and male thyroid also were steadily increasing in the post-latency period. The female colorectal rate of change was at 0.11 before 2001 and had increased to 0.68 in the post-latent period. Meanwhile, the male thyroid incidence rate was fluctuating from 0.37 in pre-1998 to 0.41 by 1998. These rates demonstrate a clear pattern of certain cancer site increases in Kuwait in the post-latency period. Modest increases in thyroid and female NHL in the mid-2000s were also documented in Kuwait. These trends were not, however, observed as clearly in the control countries' rates of change. Lastly, it should be noted that myocardial infarction's incidence rate mildly increased at a quarter case/100,000/year, meaning 2.5 in Kuwait.

**Table 7**

Table 7 explains the Attributable Risk (AR) for each site compared to the control countries. The control countries provide an estimate of the background increase that has been occurring globally.

In 1997, the change in slope for breast cancer is statistically significant at nearly 2 cases/100,000 per year (95% CI: 0.73-3.18). After five years, there is an attributable risk (AR) of 9.8 ASR. For male leukemia, there is a 2.3 ASR increase over a five-year period; females at 1.7. Female NHL does not appear to have a significant increase—and, in fact, does not capture the aforementioned spikes and ebbs in the rate distribution for the period of interest among the comparison countries. The change of slope for male NHL, on the other hand, increased leading to an AR of 1.3.

Lastly, Kuwaiti colorectal cancer is slightly increasing with an AR of 2.6 over 5 years for women and 2.9 for men in the post-latent period.

As estimated total AR of 21 additional cases/100,000 of cancer have been reported for this time period. However, given that not all the change in slopes (tpost) were statistically significant, this total is solely demonstrative. That said, 105 extra cancer cases for the Kuwait population is most likely a rather conservative estimate given the magnitude and scope of the wartime carcinogenic exposures.

**Discussion and Limitations**

This study has shown that in the post-conflict era there has been a remarkable increase of breast cancer in Kuwaiti women from 1998 to present. Given the global upward trend of background cancer rates, this increase of slope is not entirely surprising. However, the sudden change in the rate at which breast cancer is growing in Kuwait's registry data gives reason for concern with 2

additional cases/100,000/year. Additionally there was a “jump” of cancer cases in the post-latent period where BC rates did not return to the 20-25 cases/100,000/year range seen in the early 1990s. This unexpected change in rate does not occur in the Jordan or Oman rates. Also, a model with a suddenly increasing slope after a certain point in time may suggest a syngeristic influence from the relevant exposures. These results are consistent and confirm the associations posited in the study’s conceptual model. The type of growth in cancer rates that change at a certain point in time would seem to suggest a common origin, taking into account the variable latency periods for each cancer site. Compared to other cancer sites and non-related diseases, in this case, myocardial infarctions, breast cancer seems to have a uniquely higher incidence in the post-war period.

In addition, there has been a marked increase in certain hemotologic cancers with known etiologies. Given the extensive, unprecedented Kuwaiti exposures to polyaromatic hydrocarbons during the Gulf War, this was one known source of carcinogens in the environment—land, air and sea. For leukemia in Kuwait, the male and female rates doubled since the 1996-1999 years—these rates did not signficantly increase in the comparison countries. This begs the question: is this increase of rate slopes natural or the result of exposure to chemicals during the early 1990s? From the nuclear bombing of Hiroshima and Nagasaki, leukemia developed after massive radioactive exposures within five years. In Kuwait, there were massive exposures of polycyclic aromatic hydrocarbons (PAHs) and depleted uranium (DU) in 1991

and 2003, both of which are known carcinogens. It seems a latency period emerged during which time exposures were likely the strongest, and then the rates increase substantially afterwards. Leukemia, with the shortest latency period among cancers, would be the first cancers to appear after these exposures. As such, the reasons behind Kuwait's leukemia's increase warrants further inquiry. Indeed, this finding has potential public health implications and suggests that public health officials should express diligence in closely monitoring, screening and treating leukemia for the foreseeable future.

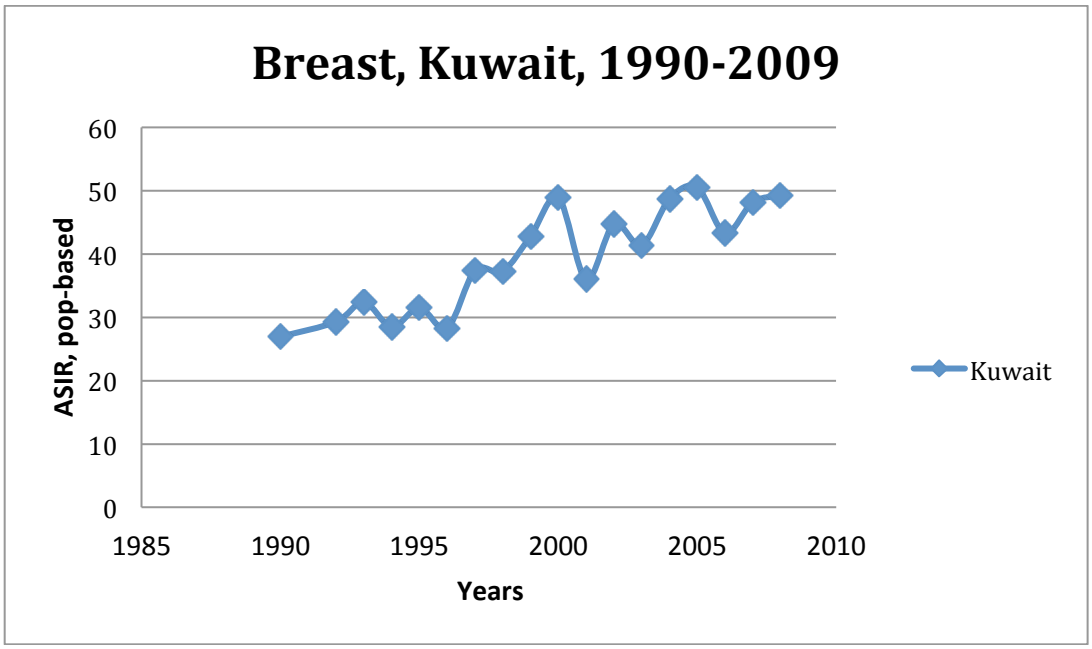
Moreover, increases in thyroid and colorectal cancers were observed in the post-latency period. While colorectal cancers are multifactorial in their etiology—although usually assumed to have some correlation with the type of diet (e.g. food, water). Furthermore, Kuwait's reported increase in thyroid cancer is troublesome as well because it implies that the population was submitted to a radiologic exposure (Gilbert 2010; Nikiforov 1994). Thyroid cancers are expected after widespread radiologic exposure in a population, such as the use of depleted uranium. This trend could possibly suggest a common regional exposure, either petrochemicals or loose depleted uranium, by way of the wind-borne sand. This region has the highest particular matter counts in the world, and experiences seasonal duststorms that flow NNW-->SSE, that is, from Iraq towards Kuwait. In other words, DU and PAH-laced dust continues to be ubiquitous in Kuwait's indoor and outdoor environments alike.

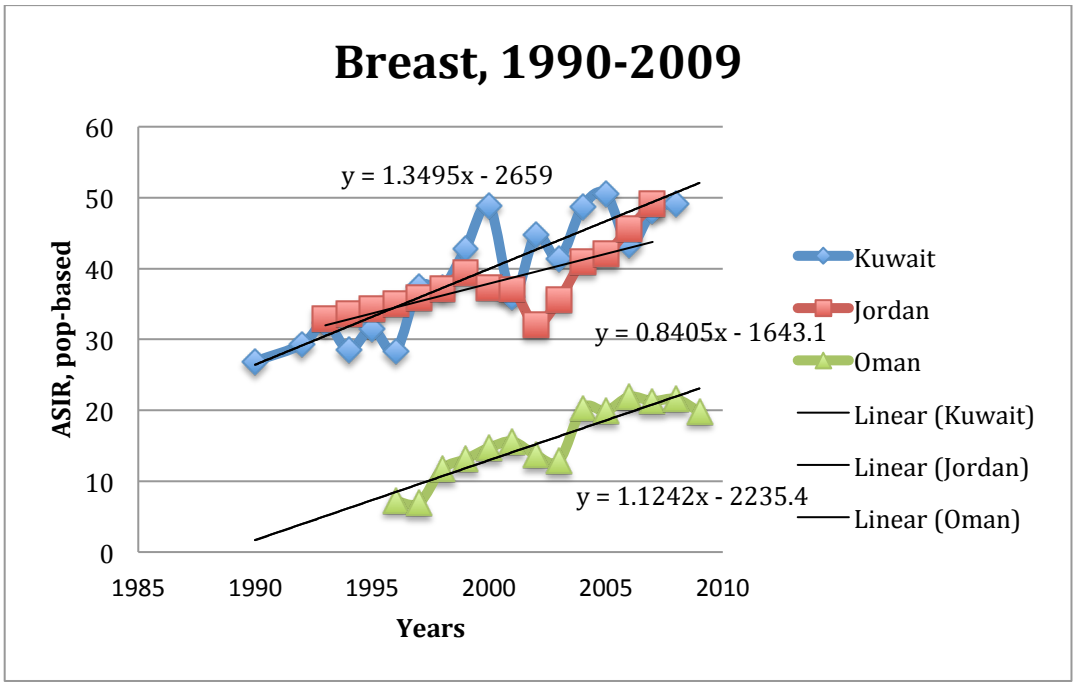
Post-conflict situations are rife with different types of exposures. Historically, there have been numerous studies conducted on veterans of war, such as Vietnam and Gulf War I veterans (Macfarlane 2003; McCauley 2002). Fewer studies have been conducted on the risk of cancer in civilians who often bear the long-term brunt of the conflict. The earlier cited studies suggest increased cancer rates in civilians (Macfarlane 2003; McCauley 2002). Indeed, it appears that there may be a syngerstic effect between toxic chemical exposures—either from weapons or as residual exposures from PAH combustion of planes and increased vehicle transport--and psychological distress that lead to higher rates of cancer in the civilian population. Most recently, there have been additional studies in Iraq that investigated the possible association between weapons and increased rates of hemotological malignancies. In Basra, only 30 miles from the Kuwait border, childhood cancers have increased by 2 to 3 fold since the Gulf War (Busby 2010).

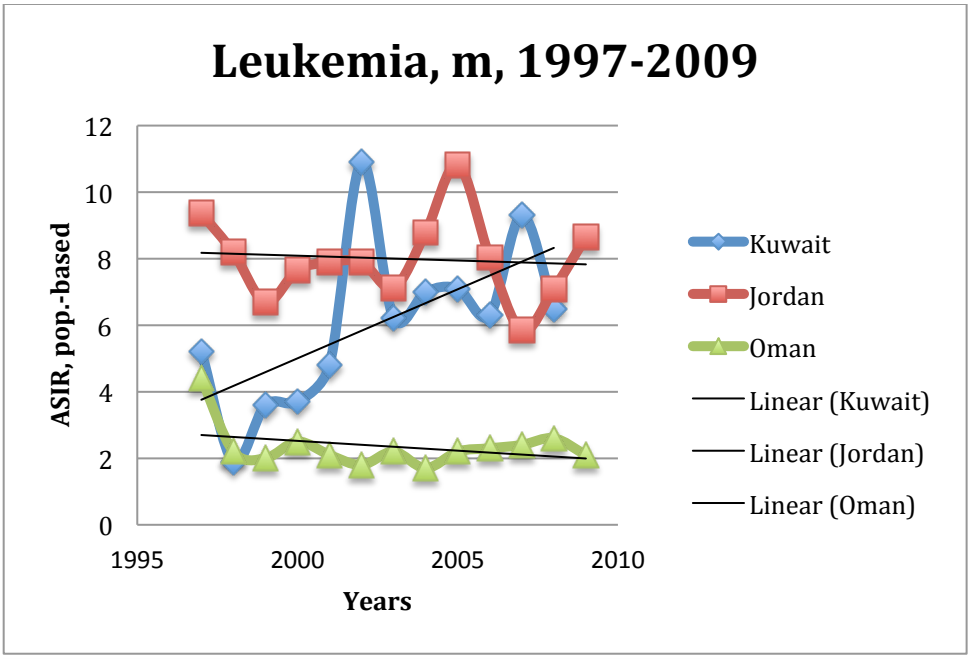
There were several limitations in this present study. First, we were analyzing small sample sizes from only three countries using short latency periods for some cancers. While similar to the Kuwaiti population, Oman and Jordan also differ in many ways from Kuwait, not the least of which, they are less developed and less affluent nations. It is entirely possible that the Gulf War was not the only source for these rate spikes. Also, the rates did not decrease to the levels of rates prior to the post-latency period. While the present study did not measure exposures, we relied on time and, more specifically, the time after the appropriate cancer latency period, ranging from 7 to 14 years, to determine when

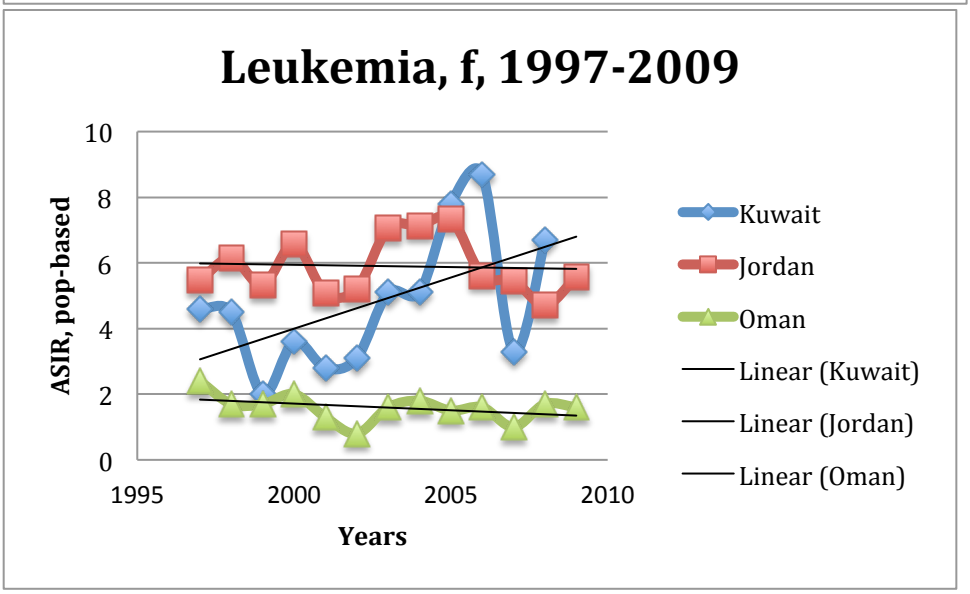
the advent of cancers would be observed. The pre-war data were also quite limited, and therefore, absolute comparisons of cancer rates pre- and post-war were not possible for all sites. Some of these increases of cancer may have been due to chance alone. That said, chance is unlikely to explain how Kuwaiti breast cancer rates nearly doubled in the 10 year period after the war to present in contrast to other Arab nations.

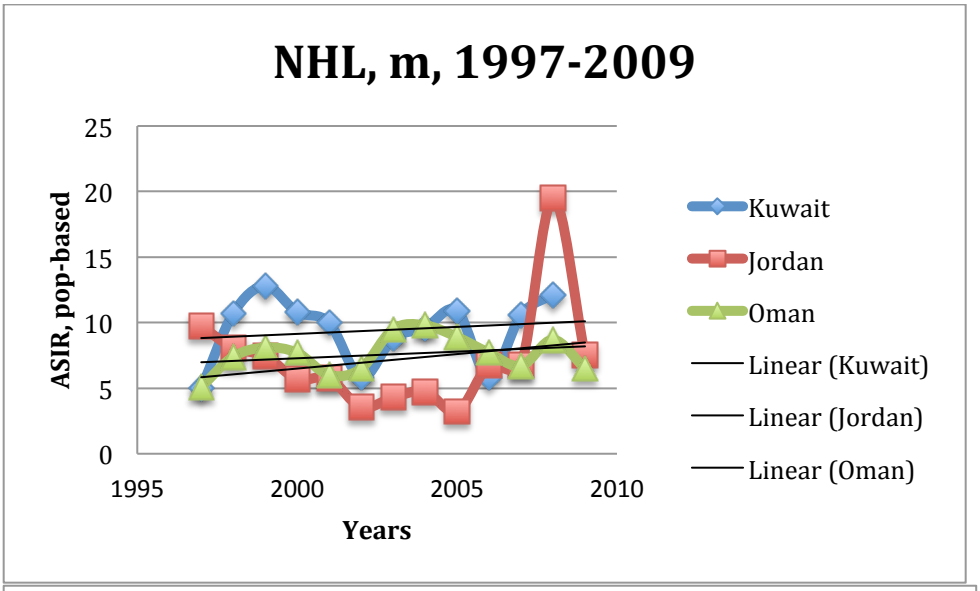
Figure 2. Cancer Trends for Kuwait, Jordan and Oman 1990-2009 & 1997-2009

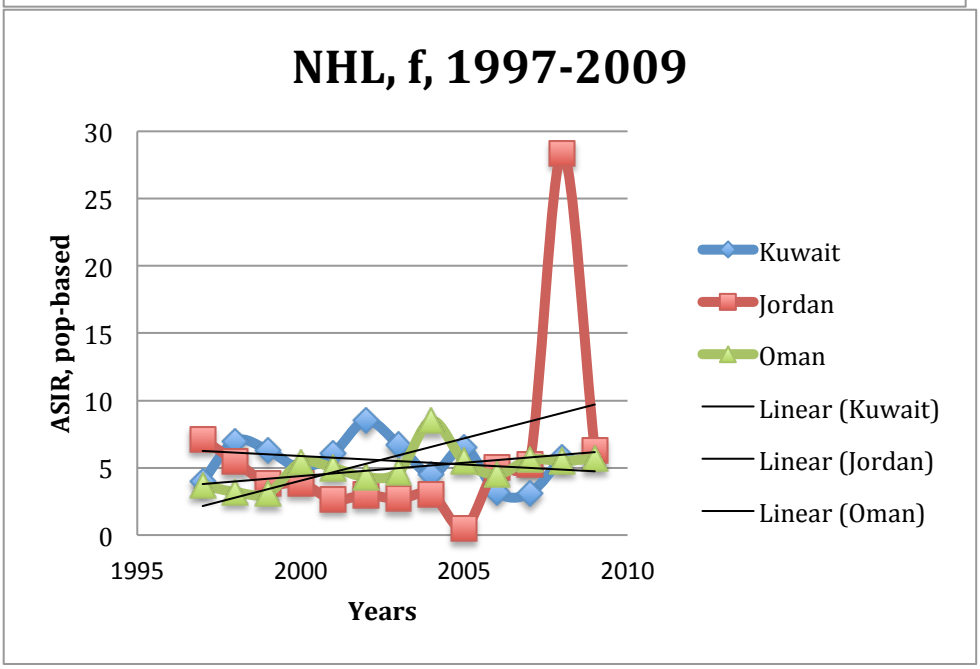


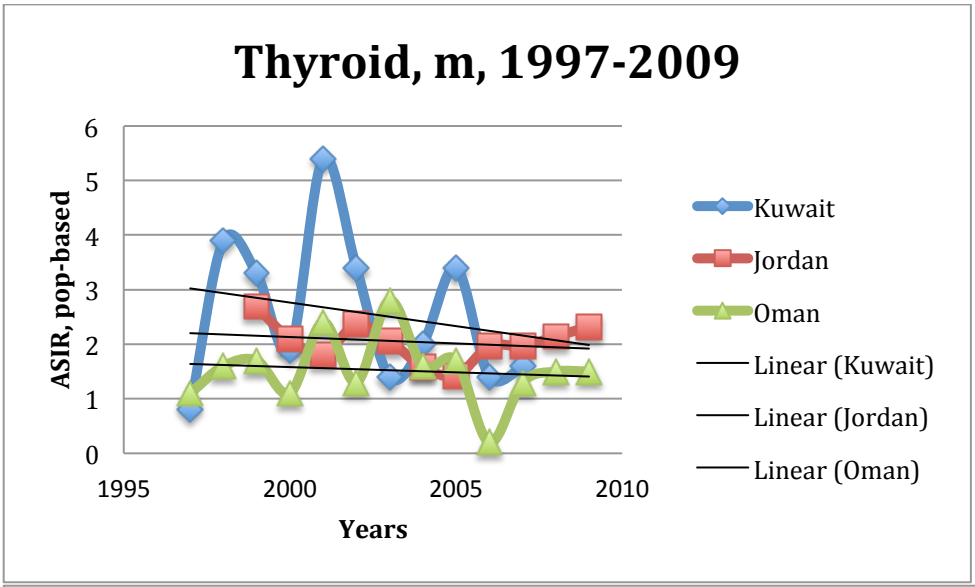



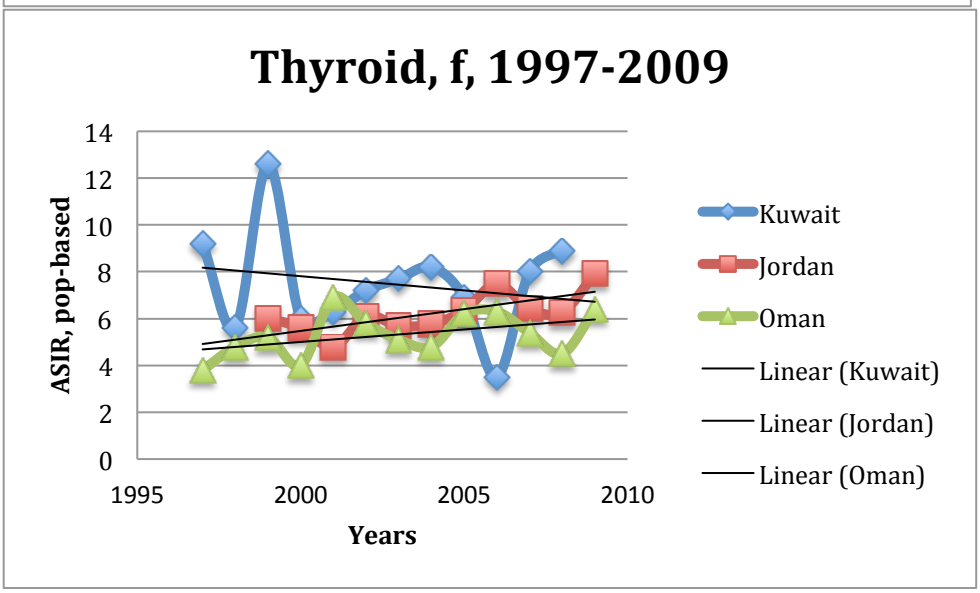

Leukemia, m, 1997-2009
ASIR, pop.-based
12
10
8
6
4
2
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)

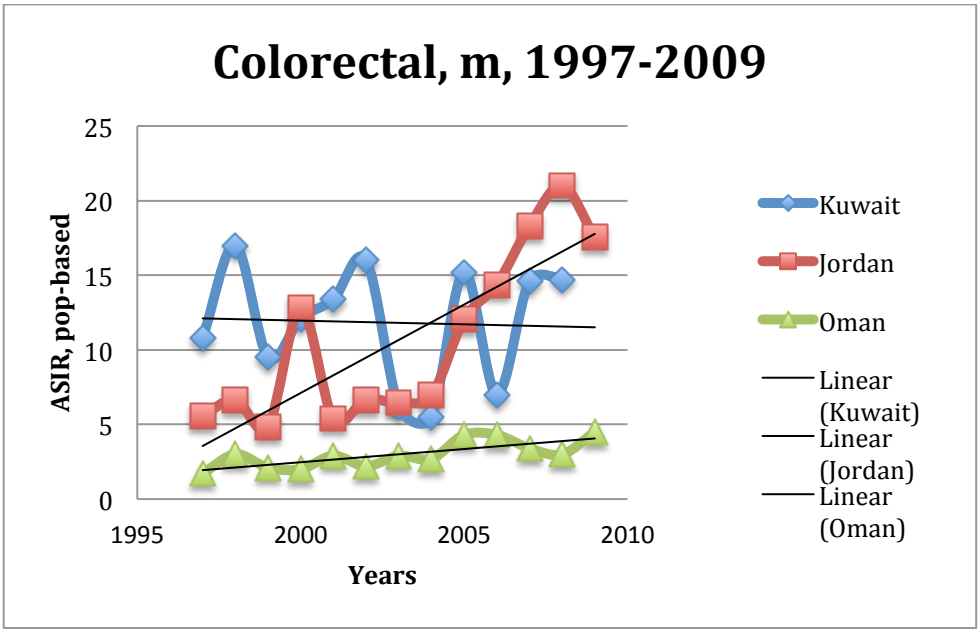

Leukemia, f, 1997-2009
ASIR, pop-based
10
8
6
4
2
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)


NHL, m, 1997-2009
ASIR, pop-based
25
20
15
10
5
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)


NHL, f, 1997-2009
ASIR, pop-based
30
25
20
15
10
5
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)


Thyroid, m, 1997-2009
ASIR, pop-based
6
5
4
3
2
1
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)


Thyroid, f, 1997-2009
ASIR, pop-based
14
12
10
8
6
4
2
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)


Colorectal, m, 1997-2009
ASIR, pop-based
25
20
15
10
5
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)

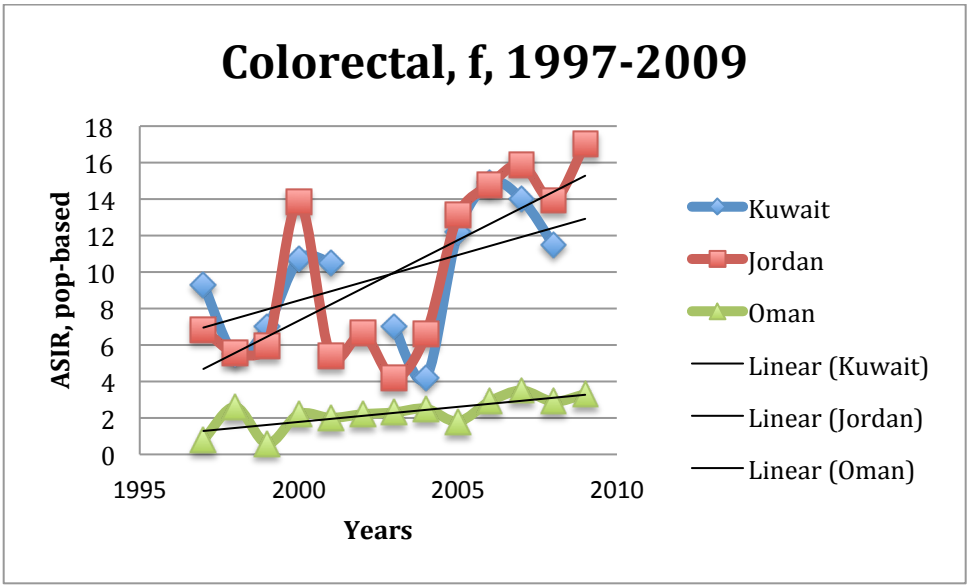

Colorectal, f, 1997-2009
ASIR, pop-based
18
16
14
12
10
8
6
4
2
0
1995
2000
2005
2010
Years
Kuwait
Jordan
Oman
Linear (Kuwait)
Linear (Jordan)
Linear (Oman)

**Table 4. Age-standardized incidence rates for select cancers by sex for Kuwait, Jordan and Oman, 1996-2007**

| Cancer Site | | Males | | | | | Females | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Country | 96-99 | 2000-03 | 04-07 | RR | (95% CI) | 96-99 | 2000-03 | 04-07 | RR | (95% CI) |
| Breast | Kuwait | | | | | | 36.5 | 42.8 | 47.7 | 1.31 | (1.14-1.50) |
| | Jordan | | | | | | 21.4 | 21.8 | 26.9 | 1.26 | (1.05-1.51) |
| | Oman | | | | | | 9.8 | 14.2 | 20.9 | 2.13 | (1.67-2.74) |
| Prostate | Kuwait | 11.8 | 12.4 | 11 | 0.93 | (0.82-1.06) | | | | | |
| | Jordan | 4.5 | 5.3 | 5.1 | 1.13 | (0.92-1.39) | | | | | |
| | Oman | 11.5 | 7.8 | 10.2 | 0.89 | (0.77-1.02) | | | | | |
| Thyroid | Kuwait | 3.8 | 3.0 | 2.1 | 0.55 | (0.42-0.73) | 9.2 | 6.8 | 6.7 | 0.73 | (0.62-0.85) |
| | Jordan | 1.3 | 1.2 | 1.0 | 0.79 | (0.50-1.18) | 3.3 | 3.4 | 4.0 | 1.21 | (0.96-1.54) |
| | Oman | 1.2 | 1.9 | 1.2 | 1.00 | (0.66-1.52) | 3.9 | 5.5 | 5.7 | 1.46 | (1.18-1.80) |
| Colorectal | Kuwait | 12.1 | 11.9 | 10.6 | 0.88 | (0.77-1.00) | 7.4 | 9.4 | 11.3 | 1.53 | (1.32-1.77) |
| | Jordan | 3.2 | 4.4 | 7.4 | 2.31 | (1.87-2.87) | 3.4 | 4.1 | 6.4 | 1.88 | (1.52-2.34) |
| | Oman | 2.1 | 2.5 | 3.7 | 1.76 | (1.34-2.33) | 1.2 | 2.2 | 2.7 | 2.25 | (1.59-3.23) |

**Table 4. Age-standardized incidence rates for select cancers by sex for Kuwait, Jordan and Oman, 1996-2007**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NHL | Kuwait | 9.5 | 8.9 | 9.9 | 1.04 | (0.78-1.40) | 5.8 | 6.6 | 4.3 | 0.81 | (0.54-1.19) |
| | Jordan | 4.1 | 2.7 | 3.0 | 0.83 | (0.49-1.40) | 3.0 | 1.9 | 2.1 | 0.80 | (0.42-1.50) |
| | Oman | 6.1 | 7.4 | 8.3 | 1.22 | (0.88-1.71) | 3.0 | 4.9 | 6.0 | 2.0 | (1.60-2.51) |
| Leukemia | Kuwait | 3.2 | 6.4 | 7.4 | 2.31 | (1.87-2.87) | 3.5 | 3.7 | 6.2 | 1.77 | (1.60-2.51) |
| | Jordan | 5.6 | 5.3 | 5.8 | 1.04 | (0.86-1.25) | 4.2 | 4.4 | 4.7 | 1.12 | (0.90-1.39) |
| | Oman | 2.4 | 2.2 | 2.2 | 0.92 | (0.68-1.24) | 1.7 | 1.4 | 1.5 | 0.88 | (0.61-1.27) |

NOTE: These cancer sites were selected based on possible etiologies related to Gulf War exposures.
Incidence rates (IR) are per 100,000 persons and were age-adjusted to relevant world standard population.
The Rate Ratios (RR) were calculated using these IRs by comparing the first and last periods.
Abbreviation: 95% CI, 95% confidence interval.

Table 5. ASR trends for selected cancer sites in Kuwait, Jordan and Oman, 1996-2009

| Cancer Site | Kuwait | | | Jordan | | | Oman | | |
|---|---|---|---|---|---|---|---|---|---|
| | $\alpha$ | $m$ | 95% CI | $\alpha$ | $m$ | 95% CI | $\alpha$ | $m$ | 95% CI |
| Breast | 26.6 | 1.33 | 1.04-1.62 | 22.6 | 1.44 | 0.81-2.06 | 1.71 | 1.12 | 0.81-1.44 |
| Prostate | 10.4 | 0.08 | -0.25-0.40 | 8.83 | 0.15 | -0.01-0.32 | 7.10 | 0.20 | -0.18-0.58 |
| Leukemia | | | | | | | | | |
| *female* | 3.27 | 0.14 | -0.02-0.30 | 4.62 | -0.02 | -0.13-0.09 | 1.75 | -0.02 | -0.08-0.05 |
| *male* | 2.77 | 0.28 | 0.08-0.48 | 8.45 | -0.03 | -0.25-0.18 | 2.4 | -0.01 | -0.12-0.10 |
| NHL | | | | | | | | | |
| *female* | 5.47 | -0.00 | -0.17-0.16 | -2.25 | 0.63 | -0.48-1.74 | 1.64 | 0.25 | 0.07-0.43 |
| *male* | 6.81 | 0.21 | -0.01-0.43 | 4.29 | 0.22 | -0.47-0.91 | 4.99 | 0.19 | -0.04-0.41 |
| Thyroid | | | | | | | | | |
| *female* | 6.42 | 0.07 | -0.13-0.27 | 3.61 | 0.19 | 0.05-0.32 | 2.70 | 0.19 | 0.03-0.35 |
| *male* | 1.49 | 0.08 | -0.05-0.22 | 2.41 | -0.03 | -0.11-0.05 | 1.28 | 0.01 | -0.08-0.11 |
| Colorectal | | | | | | | | | |
| *female* | 4.12 | 0.45 | -0.03-0.94 | -1.49 | 0.88 | 0.33-1.44 | -0.01 | 0.17 | 0.09-0.26 |
| *male* | 7.77 | 0.30 | -0.04-0.65 | -4.67 | 1.18 | 0.62-1.74 | 0.55 | 0.19 | 0.10-0.28 |

$\alpha$=intercept value; m=slope value

Table 6. Kuwait cancer rates, slopes, change in slopes for the latency periods compared to Jordan and Oman rates

| Condition | Intercept (ASR) | CI at 95% | End of Latency (Year) | Latent Period Slope* (ASR) | CI at 95% | Change in Slope (ASR) | CI at 95% |
|---|---|---|---|---|---|---|---|
| Leukemia, *male* | 2.89 | (-1.42-7.20) | 2000 | 0.35 | (-0.52-0.76) | **0.45** | **(0.23-0.67)** |
| *female* | 3.66 | (1.25-6.08) | | 0.15 | (-0.59-0.41) | **0.34** | **(-0.06-0.73)** |
| NHL, *male* | 5.29 | (2.58-7.99) | 2000 | **0.56** | **(0.16-0.96)** | 0.26 | (-0.14-0.66) |
| *female* | 4.72 | (2.46-6.99) | | 0.12 | (-0.21-0.46) | -0.19 | (-0.74-0.35) |
| Colorectal, *male* | 6.83 | (2.80-10.9) | 2002 | **0.50** | **(0.00-1.01)** | 0.52 | (-0.20-1.23) |
| *female* | 7.22 | (-1.49-15.9) | | 0.11 | (-0.81-1.04) | **0.57** | **(-0.06-1.21)** |
| Breast | 27.2 | (23.3-31.1) | 1997 | **0.99** | **(0.31-1.67)** | **1.96** | **(0.73-3.18)** |
| Prostate | 3.77 | (-6.26-13.8) | 1997 | 1.31 | (-0.43-3.06) | 0.07 | (-0.18-0.33) |
| Thyroid, *male* | 0.36 | (-1.38-2.10) | 1997 | **0.32** | **(-0.03-0.66)** | 0.09 | (-0.03-0.20) |
| *female* | 5.35 | (2.48-8.24) | | 0.28 | (-0.30-0.85) | **0.16** | **(-0.04-0.36)** |
| Heart Attack | 64.6 | (53.4-75.8) | # | 0.27 | (-0.72-1.26) | 0.27 | (-0.72-1.26) |

*This slope was calculated using Kuwait data from 1990-latency end; and 1996-latency end data for Jordan and Oman.
All the boldface values indicate statistical significance at P<0.10.
#Was not relevant to the control condition

Table 7. Attributable cancer risks for selected sites in Kuwait in the post-latent period

| | 5-Year Attributable Risk (ASR) | 30-Year Attributable Risk (ASR) |
|---|---|---|
| Leukemia, *male* | 2.3 | 13.5 |
| *female* | 1.7 | 10.2 |
| NHL, *male* | 1.3 | 7.8 |
| *female* | -1.0 | -5.7 |
| Colorectal, *male* | 2.6 | 15.6 |
| *female* | 2.9 | 17.1 |
| Breast | 9.8 | 58.8 |
| Thyroid, *male* | 0.5 | 2.7 |
| *female* | 0.8 | 4.8 |
| Total | 20.8 | 124.8 |

## Chapter 6
## Kuwait Breast Cancer, War-Related Trauma and *Owzla*

### I. Introduction: Background

Kuwait has experienced a dramatic increase in breast cancer rates since the late 1990s. This increase correlates with exposures to toxicants in the post-war period, both immediately following the war and over the long-term. Most notably, the Kuwait population was exposed initially to toxicants during the massive oil well fires that lasted nearly 8 months. Most of the polycyclic aromatic hydrocarbons (PAHs) that were released during these fires are known carcinogens (Chapter 1 & 3). As the Kuwait government has not proceeded with a proper environment clean-up, the Kuwaiti population has been chronically exposed to these PAHs since 1991. The breast, as a site of the endocrine system, is a likely bodily site affected by chronic, sustained exposures to these chemicals (Davis 1993).

Also, many Kuwait residents were, and still are, traumatized by the events of the war: a recent survey found that PTSD today still affected around 20% of the female population (Hammadi 2008).[112] Lastly, this chapter focuses on the growing effects of modernization and increasingly unstable political situation; it seems likely that alienation, or *Owzla,*[113] is on the rise in Kuwait. This new concept will be described in more detail in subsequent sections. [114]

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[112] This 20% is obviously all due to the Gulf War, but may be a subpopulation that is still recovering from the war and were re-injured.

[113] *Owzla*: Arabic for alienation or loneliness

[114] Potential Benefits of Qualitative-Oriented Questions: in the pilot phase, I examined patients' perceptions of the etiology of their diabetes. Many patients had commented on possible links

***Objective***

This chapter aims to understand the role of the Persian Gulf War on Kuwait health, and how other environmental factors and stressful life events may have contributed to the etiology of breast cancer. In particular, I am investigating if there is an association with breast cancer(BC) prevalence and extreme, sustained stress, alienation(*Owzla* in Arabic), exercise, residence in Kuwait during the oil well fires, and family history.

In Chapter 3, the derivation of the study hypotheses were explained at length. Here I would like to remind the reader of these research questions. Here are the hypotheses derived from these questions:

1. Are women who have lived in Kuwait during, or in the period immediately after, the Gulf War more likely to develop BC than their peers who did not live in Kuwait during this period?
2. Are female patients who report more stressful life events, trauma and/or alienation more likely to have BC than women who do not?
3. Are female patients in the BC screening group more likely to report certain personal characteristics (e.g. exercise, family history) compared to women receiving usual care?

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between their illness to the chemical fallout from the war. These types of responses would not have been properly captured in a strictly quantitative instrument. Moreover, the study was conducted in such a way that the participant learned something new about the disease and/or its social context.

## II. Methods

### *A. Population and Study Design*

As I return to Kuwait in January 2011, the revised survey will include two new sections (detailed below). This cross-sectional, case-control study enrolled women between 18-86 years old.[115,116,117] For these sampling groups, I created three groups: the cancer group was 150 (n=121), the "screening/at-risk" group was 200 (n=215) and that the control group was 250 (n=253). The total sample was N=589 individuals, close to the study's initial goal of 600. [118]

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[115] *2007 Pilot Study* I conducted a Quality of Life (QOL) survey among diabetic patients in Amiri Hospital between November 2007-February 2008. This cross-sectional study involved Kuwait nationals and Arab nationals living in Kuwait aged 1-86 who attended the hospital's diabetic clinic. During this time I interviewed 370 Type 1 and Type 2 patients. In addition I designed and enrolled a control group (n=125) that was made up of healthy individuals without family history of Type 1 diabetes. The control group was composed of healthy family members recruited at the hospital waiting rooms and college students.

Using the same post-conflict survey, the instrument measured several aspects of the participant's well-being (i.e. Quality of Life in two parts, one formal using the European Quality of Life and Falsetti scales, the other unstructured (DiGiacomo 1999, Bernard 2002, ECQLQ 2011). The unstructured part of the instrument had already been administered in several post-conflict areas such as Albania and Rwanda (Eytan 2004; Pham 2004).

[116] *Why repeat this survey in a cancer population?* As I returned to Kuwait in January 2011, I planned on using the same post-conflict health questionnaire as described previously. However, I wanted to propose returning to the Kuwait population for several reasons. First, it was prudent to replicate the survey instrument. Replicability refers to the extent to which a metric can measure the same thing twice (Guillemin 1993). If the measure performs as the dominant theory suggests, then we were to be sure that the construct was replicable in the cancer population (Guillemin 1993). Secondly, another visit allowed me to compare responses from the previous visit to the most recent one. Lastly, I sought to pose several new questions to the sample. Namely, I wished to inquire about their views on alienation and trauma. As cited in the earlier conceptual model, these two concepts are important for better understanding the disease pathways.

[117] The detailed biological reasons I chose breast cancer are discussed in Chapter 3.

[118] Furthermore, I reflected on the institution's point of view. A randomized-controlled trial in Kuwait would require a lot of organizational review and support, even if simply logistical.[118] To that extent, what is the currency for the institution? What will it gain from the project? I proposed that this research would shed more Although Kuwait has a relatively sophisticated health infrastructure, compared to its neighbors, it is not on par with the U.S. system or its European allies. Additionally, there is perhaps an over-reliance on workers from outside Kuwait.

These three groups were a breast cancer patient group, a breast cancer screening group and a control group. The second group was composed of women who had been prescreened for being at-risk for breast cancer and women who presented with symptoms (e.g. breast pain or swelling). The breast cancer group was clinically diagnosed and, in most cases, treated within the past year.

***A Tiered-Exposure Case-Control Study***

There were a lot of various studies from which to choose how to approach this project using a screening group. Many of the previous studies had chosen women and then performed a biopsy to determine if they had breast cancer or not (Geyer 1993). However, these studies were essentially prospective because they spoke with the women before and after the biopsy—using two different surveys. In Kuwait, this would require very involved work with local collaborators and, therefore, was not feasible to conduct with the study's limited resources and time. Another possibility was to meet women who were being screened and women who had just been diagnosed. However, it is not clear that there would be a significant difference between these two groups in terms of level of stress and/or trauma. Furthermore, as mentioned elsewhere in this project, a large part of this project was to identify the lived experience of women already diagnosed with cancer versus those who may have it, but are not yet diagnosed. Breast cancer diagnosis is often a life changing, even traumatic event, in and of itself. Thus, three groups were proposed to measure three different levels of exposures and to try to hold constant the post-diagnosis effect on the breast cancer group.

This means that we are interested in a "hierarchy of exposures" (HoE) or "levels of exposures." As discussed extensively in Chapter 2, the life course theory also espouses this notion of exposures growing over time in a population and across levels. In other studies, the concept of HoE has been used in studies on HIV with groups based on the individual's mode of exposure to HIV (e.g. Injection drug use, Dean et al 2002), and another study investigated the effects of working at an airplane crash site with the groups grouped by the type of exposure to human remains (e.g. via the morgue) (Delahanty et al 1997). In this project, there is one case group with two controls, and the two controls should be of different levels of exposures, both trauma and chemical, as well as risk factors.[119] We interviewed participants before the screening took place. Some women were undergoing mammography and others ultrasound, depending on what their physician requested. In other words, in terms of *a priori* hypotheses, we would expect higher stress, i.e. poorer mental health scores, in the screening group over the other two groups. Trauma symptoms, however, would be expected to be the highest in the breast cancer group, although trauma symptoms would also be elevated in the screening group compared to the control--per HoE.

It is interesting to examine a so-called screening group for several reasons. First, it takes into consideration the *white-coat effect*. During the screening, there are a lot of unknown, and therefore potentially stressful, variables for everyone: the clinician, the women, her family/accompaniment, etc.

[119] This is an assumption as we selected the groups based on their disease status, not exposure *per se*.

Second, the breast cancer group has already lived with cancer for several months, if not years, so their experience maybe filled with certain PTSD-specific symptoms, perhaps more depression and less anxiety, and more pain than a "waiting-to-see" group, i.e. the screening group (McGregor 2012). Essentially such a screening group should be at higher rate of certain stress-related mental health outcomes than the cancer group because they are being subjugated to a stressful procedure. The Westerner train of thought is that screened women are healthier (Dr. Alma 2011). That said, it may be the case that this screening group constitutes a group of more “worriers” than the other two groups (McGregor 2012). In this way, perhaps they are more concerned with their health care and have self-referred to the clinic.

**B. Survey Measures**

For the survey instrument, I drafted questions based on the answers collected and analyzed from the pilot phase on diabetic patients and controls (Bernard 2002, Cange 2009). Indeed, I also planned and developed this study and its questionnaire from beginning to end based on the efficacy of this pilot survey. The participants were asked a series of questions regarding demographics, physical (Quality of Life) and mental health (e.g. depression, alienation, agoraphobia, anxiety) (Trochim 2001). This post-conflict instrument measures several aspects of one's well-being: a) exercise/dietary status (2002), family history/entourage of friends disease history (e.g. cancer, chronic disease, respiratory illness, etc.), and c) exposure status (location during and after Kuwait

war). As to Alienation, or *Owzla*, the concept was measured by way of the Alienation instrument.

**Adopting the instrument to the Kuwaiti audience (2007 & 2011)**

This breast cancer survey was specifically designed for Kuwait. The adaptation and validation of the instrument involved the following steps. First, the complete translation of the document was undertaken with local staff (Cange 2009). Native Arabic speaker interviewers were recruited and were trained to administer the surveys with participants in the Arabic language (Cange 2009). They were trained in cultural sensitivity, survey implementation methods and proper attention to the patient's concerns.[120] Then, the instrument was briefly field-tested to ensure compatibility with local cultural norms. Lastly, we checked for reliability and replicability of the survey (from the pilot) by performing a series of pre-tests and requesting feedback from other cancer-oriented colleagues and patients.

[120] I discuss at length arriving in Kuwait for the first time in Chapter 4 regarding the difficulties in securing access to various sites. In short, it became clear that foreigners were not encouraged to "stop by" and launch a public health project. Rather, there was more skepticism and paranoia about my background and about my motivation for learning Arabic (e.g. that I was a CIA agent).
I describe in depth my process of gaining approvals and access to the hospital in Chapter 4. This chapter explicates the vast and necessary anthropologic tools that I privileged in order to be able to launch this project. Indeed, this survey took several years to coordinate because of the politicization of the Kuwaiti cancer hospital.

## Quality of Life Measurements

The survey instrument was based on the European Quality of Life questionnaire and the Haley Veterans' survey instrument. (http://www.euroqol.org/ 2011) The original Quality of Life survey has four discreet scales, Satisfaction, Impact, Worry, and Social/vocational worry. This instrument was designed to incorporate typical concerns of diabetic patients. For this breast cancer survey, we wanted to exploit the social, cognitive and emotional status subscores which contain several items to measure each participant's outcome. Our QOL survey consisted of 35 items rated by the respondent on a 5-point Likert-type scale with answers ranging from 1 to 5 (i.e. continuous). While a score of 1 indicates no impact or worries, and a score or 5 represents always being affected by the relevant question. The original QOL measure was proven to have a high degree of internal consistency (Cronbach's $\alpha$= 0.66-0.92) (ECQLQ 2011).

## Trauma and *Owzla* Measures

Among the mental health responses, I used modified survey scales to measure trauma (*sidma*) and, in a certain way, alienation (*Owzla*) in the Kuwaiti context, in addition to QoL. Owzla, and the questions subsumed under this heading, was measured using the Ray scale (Ray 1982). This scale relies on 21 items that were measured in Australia in an Arabic-speaking population. They were found to have internal validity and consistency in Arabic-speaking populations in Australia (1982). These items were grouped in several subscores:

*Trust*: measuring the amount of trust between individuals in the community; *Governance*: how well the participant feels that the government is carrying out its duties to provide services and make/enforce laws; *Norms*: the society functions in way whereby individuals follow and abide by norms; *Destiny*: the individual feels that there is a bright future, that they living life as it is supposed to unfold; *Social Support*: the participant feels that she receives adequate support from her family and friend network (Ray 1982). The respondents rated their answers by true, false and maybe.

Meanwhile, traumatic impacts were measured using the UCLA PTSD scale and the modified PDS scale (Falsetti et al 1991). From the UCLA scale, we used the first section that offers the definition of trauma and gives some examples of types of trauma with the severity of the participant's event. There may be some overlap in the way the event is considered because the word "trauma" is mostly a Western concept that is translated to "shock" in Arabic. For example, some stressful life events may also be classified as traumas (e.g. infidelity). For the remainder of our scale, we employed the PDS Falsetti scale which is based on 17 questions, the definition of trauma is explained to the individual and then given several examples of trauma. If the individual confirms that she has experience such a traumatic event, the event is recorded and the Falsetti scale is administered. Otherwise, the interview moves on to the next scale. For those reporting a traumatic event, the individual is queried on several questions that refer back to the event, e.g. "Do you have nightmares since the event?" "Do you have flashbacks of the event?" These responses are recorded

on two scales: one for intensity (1-5) and another for frequency (0-3) (Falsetti et al 1991). These two scales allowed the researcher to measure PTSD based on cut-offs in the study's groups, for example, above 46 is a typical cut-off for PTSD diagnosis in a community sample (Foa 1992).

**Demographic Measures**

In addition to the questions above, the questionnaire sought information on socio-demographic characteristics, and family size. Educational levels of the interviewee were classified into high, middle, and low. The 'high' included secondary school and above; the 'middle,' primary and intermediate education; and the 'low' read and write and illiterate. These correspond to the Kuwait educational system. Occupational level of the interviewee was categorized into three levels: 'high' which included high and low professionals; 'middle', skilled and partly skilled; and 'low', unskilled. If the participant was retired, the most recent occupation was considered.

**Breast Cancer Risk Factors**

To measure breast cancer risk factors, we were most concerned by age, exercise and family history. These are three strong predictors of breast cancer in females (NCI 1997, Tomlin 2001, Schmidt 2009, Chang 2009, DeRoo 2010, Anderson 2010). We also measured nationality, BMI,[121] age, education, and employment status. The implication is that many, if not all, of these factors may affect carcinogenesis over the life course (see Chapter 2 & 3).

[121] Height and weight were measured to calculate BMI.

## C. Data Collection

### *Recruitment*

The interviewers[122] approached the participants during the working hours, typically mornings, and the purpose of the questionnaire was explained to these patients or controls. Recruitment strategies were on a volunteer-basis. Response rates were at 95% for all groups. Participants were selected based on systematic random sampling (i.e. every third patient seated in the waiting room). Oral screening took place using the screening questions on the questionnaire (See Appendix). The investigator sought and received proper IRB approval from both the UW and Kuwait Ministry of Health to conduct this study. As part of these approvals, participants were screened after giving written consent. For each group, there were inclusion and exclusion criteria: the participants were part or fully Kuwaiti or Arab nationals born in Kuwait; patients must be diagnosed with breast cancer or be undergoing a breast cancer screening either by mammography or ultrasound; and not have other cancers or chronic diseases. Controls were patients who were healthy individuals, female, and were between 18-85 years old. Non-Arabs were not included in the study due to their heterogeneity and transient nature in the Kuwaiti context. The entire interview lasted between 30-45 minutes.

Between June 2011 to October 2011 female patients were recruited at local hospitals (i.e. Amiri, KCCC, Mubarak or Farwaniya depending on the group) from diverse socio-economic areas. If potential participants declined, the reason

[122] Three interviews were recruited during the course of this project. In the data analysis, there was no statistical difference between these women.

for the non-participation was recorded in the research notes. These notes allowed us to later calculate the response rate of the survey.

**D. Data Analysis**

The statistical analysis was carried out using STATA 12.1 (STATACorp, College Station, TX, 2012). Descriptive statistics (means, frequencies) were produced for the demographic data, and frequency distributions were examined for normality before the use of parametric analyses. More specifically, I used the tabulate function in STATA to find the percentage of each variable for each group and the totals among groups. I employed a logistic regression[123] to find the model that best fits the survey response data for the three hypotheses, measuring characteristics between two groups at a time (e.g. breast cancer vs. screening group). For the regression, I examined several univariate models, and selected the variables to include in the multivariate model that best respond to the research hypotheses (i.e. 1, 2, 3) and proved statistically significant (UW Biostat 2012). Based on counsel from the U.W. Biostatistical Consultation Service, I was encouraged to select the demographic variables for the multivariate model that were significant (UW Biostat 2012). The significance of these tests given that the level of statistical significance was set at $p \leq 0.05$. They were considered marginally significant at $p \leq 0.10$.

[123]In a logistic regression model, the conditional mean may also be represented by the expression E(Y I x). However, the equation is no longer linear in x. In fact we have:

$$P(t) = \frac{1}{1 + e^{-t}}$$

For these analyses, I employed logistic regression. The dependent variable used in this chapter's logistic regression mode is P $\epsilon$ {0,1}, with 0(1) indicating non-breast cancer (breast cancer) outcome under consideration. As such there are three models to test: BC-control; BC-Screening; and lastly, Screening-Control.

$Y_{Breast\ cancer}$=

$\alpha$ + $\hat{\beta}_1$*Demographic/Personal Characteristics + $\hat{\beta}_2$ *Physical Health + $\hat{\beta}_3$*Mental Health + $\hat{\beta}_4$*Traumatic Event + $\hat{\beta}_5$*Alienation + $\hat{\beta}_6$*Exposure + $\varepsilon$

**Model Covariates**

These independent variables represent various scales measured in clinic with the groups:

*Age:* The age at the time of survey completion

*Exposure*[124]*:* Time in months present during the Gulf War oil well fires.

*Physical Health:* Physical Functioning + Fatigue + Pain (EORTC QLQ 2007)

*Mental Health*[125]*:* It is comprised of the Cognitive, Emotional, Social, and Role Functioning subscales (EORTC QLQ 2007); also referred to as "stress" given that the individual may not have on-going, diagnosed mental health issues.

*PTSD symptoms*[126]*:* Self-reported trauma and Falsetti scale score (1993)

*Alienation:* Questions about society and the individual's role (Ray 1982)

[124] Hypothesis 1
[125] Hypothesis 2
[126] Hypothesis 2

## III. Results

*Demographic Characteristics*

The three groups had fairly similar demographic characteristics. Nevertheless, there were also some noticeable differences among the three groups (Table 1). In short, the control group had a lower BMI with 82% of the breast cancer group overweight or obese (BMI>25) and the control group at 76%. Meanwhile the breast cancer group was older than the control (27% of the respondents were 56 or older), and the screening group was much younger than either (14% were 56 or older). The breast cancer group also reported being widowed at 14% compared to 5% in the screening group. The breast cancer group also was more retired at 30% versus 16% and 20% for the screening and control group, respectively. Interestingly, the screening group had a higher income than the two other groups with 17% at 1001 KD/month[127], compared to 13% in the other two groups. Also, the screening group appeared to be more highly educated than the other two groups. In terms of nationality, the control group reported more often "Kuwaiti" (72%) while the screening group reported the most number of "other," including Asians and individuals of European descent (16%).

We compiled descriptive results of wartime residence, physical and psychological health as well as indicators of *Owzla* (Table 2). The screening group reported much higher scores for poor physical health (12% at scores of 40+ in the screening, versus 2% in the breast cancer and 8% in the control group at this threshold). Also 71% of the breast cancer group spent 9 months or more

[127] 1KD=3.55 USD

inside Kuwait during or just after the war compared to 64% in the other two groups. For the 38% of women who did report a traumatic life event, the women in the breast cancer and screening groups were more likely to have clinically significant PTSD scores (46+) than the control group (18%, 16% vs. 6%). In terms of mental health, the breast cancer group faired the worst with the least functioning scores for cognitive and emotional subscores compared to controls (63 vs. 72; 64 vs. 75),[128] and for Emotional health, worse than the screening group (64 vs. 70). The remaining subscales did not indicate much variation among the groups. As to the measure *Owzla*: the breast cancer group seemed to report feeling overall more alienated in society than the other two groups (96 vs. 86 and 87). Lastly, the reported qualitative data were interesting insofar as many women intimated knowing family members or friends suffering from cancer or Multiple Sclerosis (M.S.). In the next section, we will present the results for the logistic regression results of the three analyses, systematically presenting results for each hypothesis

*Are women who have lived in Kuwait during, or in the period immediately after, the Gulf War more likely to develop BC than their peers who did not live in Kuwait during this period?*

Compared to women with 0-4 months of war residence (Table 3), women with 9-16 months of war residence had 1.35 the odds of having breast cancer than healthy peers, but the association was not significant (OR 1.35 for 8+

[128] The Quality of Life scale is out of 100, so higher scores are better ones. The scoring procedures appear in the appendix of this document.

months in Kuwait, CI at 95%: 0.7-2.7, P>|z|: 0.41).. For the breast cancer women compared to women receiving screening (Table 4), women with 9-16 months of war residence had two times greater odds of having breast cancer, compared to women with 0-4 months of war residence (CI at 95%: 1.1-3.4, P>|z|: 0.03), but this association was no longer significant in the multivariate model (CI at 95%: 0.7-3.2, P>|z|: 0.26). Lastly, for screened women compared to healthy controls, women who had 9-16 months residence had lower odds of being screened than women with 0-4 months of residence in the univariate model, but this association was not significant in the multivariate model (Table 5).

*Are female patients who report more stressful life events, trauma and/or alienation more likely to have BC than women who do not?*

In the breast cancer compared to control analysis (Table 3), women with *Owzla* had almost 1.6 greater odds of having breast cancer (CI at 95%: 1.0-2.6, P>|z|: 0.07). Additionally, women who reported a traumatic event in their past had 2 times the odds of having breast cancer (CI at 95%: 1.2-3.2, P>|z|: 0.01). In terms of life events, there was a tendency for women who were retired women to have breast cancer women (OR 1.5, not significant) and widowed women were nearly 6 times the odds to report cancer of controls (CI at 95%: 1.7-20.6, P>|z|: 0.01) (Table 3). The loss of a spouse has been largely reported as a significant life stressor on the PTSD scale in this study (UCLA 2001).

Regarding the breast cancer group vs. the screening group, women with stress or mental health concerns were 1.5 times the odds to have breast cancer

of the screening group (CI at 95%: 0.4-8.8, P>|z|: 0.03) (Table 4). However, women reporting a traumatic life event were not necessarily more likely to have breast cancer (OR 1.2, CI at 95%: 1.1-1.8, P>|z|: 0.46) than screening women. In addition, there is a tendency for women who are retired to report breast cancer (OR 2.5 CI at 95%: 0.6-9.6, P>|z|: 0.20) or have worked in a technical-level job (Table 4). *Owzla* seems to be at an odds of 1.0 in the breast cancer group such that most likely it was not affecting breast cancer women more than controls. Moreover, the subscale lack of trust in others was slightly higher at 1.01 (CI at 95%: 1.0-1.01, P>|z|: 0.41) (Table 4).

Lastly, for breast cancer screening group vs. healthy Kuwaiti women, women with stress or mental health concerns were 1.7 times the odds of having breast cancer compared to the healthy group (CI at 95%: 1.3-2.3, P>|z|: 0.0) (Table 4). For the women reporting *Owzla*, seemed to be at an odds of 1.4 (CI at 95%: 0.8-2.3, P>|z|: 0.00) of being in the screening group over the health group. Moreover, the subscale for lack of trust in others was at parity (CI at 95%: 1.0-1.01, P>|z|: 0.94), although marginally significant in the univariate analysis (OR: 1.00. CI at 95%: 0.99-1.00, P>|z|: 0.09) (Table 4).

*Are female patients in the BC screening group more likely to report certain personal characteristics (e.g. exercise, family history) compared to women receiving usual care?*

Now, we present the results of the third hypothesis of the odds of women seeking breast cancer screening or healthy Kuwaiti women. In this analysis, we

witnessed that screening participants are more likely to be younger than the healthy group 1.89 times in the univariate model (CI at 95%: 0.92-3.90, P>|z|: 0.08) (Table 5), but the association was no longer significant in the full model. Also there was a tendency for these breast cancer women to be non-Arab (OR 3.3 CI at 95%: 1.2-8.7, P>|z|: 0.20) or had worked in a technical job (Table 5).

**IV. Discussion and Limitations**

From this survey of Kuwaiti women with breast cancer, screening and health controls, we can surmise that there may be associations with the exposure during the Gulf War oil well fires (Hypothesis 1), stress (Hypothesis 2) as well as screening group personal characteristics (Hypothesis 3) and the development of breast cancer. The breast cancer group reported mental health concerns with nearly double the odds of either the screening or the control groups. Also, the breast cancer group recounted nearly two times the odds of experiencing a traumatic event over the control group. This multivariate model result suggests that breast cancer may be associated with traumatic events possibly linked to the Gulf War. Even if the woman did not report the war as the main traumatic event, the war may have lead to the claimed event or it may have been a contributing factor to the reaction from the event of record. In this way, untreated trauma may continue to impact the victim for many years after the post-conflict event occurred (i.e. the Gulf War).

These multivariate results are mostly consistent with the mediators in the project's conceptual model that predicted staggered results over time based on

multi-layered exposures and mediators. The one noticeable exception was the protective result of family history on the breast cancer group. This finding from this multivariate model may be due to reporting error. Alternatively, the screening group may have been referred because of the woman's family history.

*Owzla*, our novel measure of alienation, seemed to suggest that there was a lack of trust in the breast cancer and screening groups when compared to controls in the multivariate models. This may be a result of the recent political tension in the country. Also, perhaps the women diagnosed with cancer felt a feeling of distrust against the government given the lack of attention and denial of environmental clean-up of carcinogens in their communities.

Indeed, the health impacts of the Gulf War will be felt for a long time into the future, and the health impacts of the war will only be known through constant research initiatives. This study had several limitations. First, there was limited access to patient medical histories and limited access to patients in clinic in certain areas of the clinics where the surveys were conducted. To this extent, data were not collected for the models regarding the reproductive characteristics, such as the number of children previously birthed. Also, there may have been misclassification bias and/or reporting bias as in any surveying protocol.

Selection bias may have also played a role in terms of how individuals were recruited as or attracted to be participants (Shadish 2002). This type of bias may constitute a threat to internal validity for the study (Shadish 2002, Krieger 1999). For example, women who are more easy-going may have been

more willing to agree to sit for the interview. Other unobserved confounders also may explain some the observed associations between psychosocial factors (i.e. stress/trauma/alienation) and breast cancer status.

Chapter 6 explored several issues central to understanding Kuwait's changing post-conflict health profile: personal characteristics, collective and individual-level trauma, *Owzla*, and Gulf War chemicals. This investigation determined that the breast cancer group is indeed distinct from the other two groups in several important and significant ways, particularly in the ways that psychosocial issues influence breast cancer development. Moreover, this study demonstrated the use of an *Owzla* scale in Kuwait, only the second time that *Owlza* has been measured in an Arab population. Indeed, while there have been a few studies that refer to aimlessness, worthlessness, lack of ambition or goals among Kuwaitis, this study was the first to attempt measure it in a specific post-conflict population. To this extent, the project has exposed a interesting sociological factor for future exploration in Kuwait as predicted in the earlier conceptual model as highlighted in Chapters 2 and 3. War has serious and persistent effects on the psychological and physical health of the target country's population. Similiarly, while the Gulf War is fading into distant memory and some of the collective and individual traumas have dissipated, many Kuwaits voiced to me a noticeable breakdown of society. *Owzla* is a way, as demonstrated in the multivariate models, to capture residual psychological effects on Kuwaitis. Also, it seems to be associated with the national breast cancer incidence as well.[129]

[129] In particular, this project's alienation piece was concerned with the participant's relation with

Given the realities discovered during this investigation and the paucity of rigorous studies conducted in civilian populations, we suggest further research on the role of stress and trauma on carcinogenesis in civilian populations. Future research may examine:

1. How much of the current PTSD rates in Kuwaitis are related to the Gulf war vs. new influences or events?
2. Why is *Owzla* a recurring theme in Kuwait and will it continue to influence societal relations in a time of political crisis?
3. What would biometric samples, when paired with psychosocial measures, reveal about the chronic exposure of Kuwaitis (e.g. depleted uranium measured in hair samples)?

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non-familial contacts, i.e. those who may belong to an ethnic, sectarian or religious group different from their own. Furthermore, the recent political uprising that has struck Kuwait since summer 2011 has most likely had some base connection to this phenomenon.

Table 1. Personal Characteristics of the Three Female Cohorts

| | | Breast Cancer N=121 | | Screening N=215 | | Control N=253 | | Total N=589 | |
|---|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | n | % |
| Age (yrs) | $\bar{x}$ (95% CI) | 48.5 | (46.3 50.8) | 44.2 | (42.6 45.7) | 43.9 | (42.2 45.6) | 45.2 | (44.2 46.2) |
| | 18-25 | 5 | 4.1 | 16 | 7.7 | 24 | 9.5 | 45 | 7.8 |
| | 26-35 | 8 | 6.6 | 25 | 12.1 | 49 | 19.4 | 82 | 14.1 |
| | 36-45 | 27 | 22.3 | 72 | 34.8 | 57 | 22.6 | 156 | 26.9 |
| | 46-55 | 48 | 39.7 | 65 | 31.4 | 69 | 27.4 | 182 | 31.4 |
| | 56-64 | 27 | 22.3 | 22 | 10.6 | 40 | 15.9 | 89 | 15.3 |
| | 65+ | 6 | 5.0 | 7 | 3.4 | 13 | 5.2 | 26 | 4.5 |
| Education | Illiterate | 6 | 5.0 | 14 | 6.7 | 13 | 5.1 | 33 | 5.7 |
| | Primary | 28 | 23.1 | 26 | 12.4 | 40 | 15.8 | 94 | 16.1 |
| | Secondary | 26 | 21.5 | 59 | 28.1 | 72 | 28.5 | 157 | 26.9 |
| | 2-year Degree | 22 | 18.2 | 34 | 16.2 | 61 | 24.1 | 117 | 20.0 |
| | 4+ years of college | 39 | 32.2 | 77 | 36.7 | 67 | 26.5 | 183 | 31.3 |
| BMI | $\bar{x}$ (95% CI) | 29.5 | (28.5 30.6) | 29.2 | (28.5 30.0) | 29.7 | (28.9 30.5) | 29.6 | (29.1 30.1) |
| | <20 | 4 | 3.3 | 6 | 2.9 | 8 | 3.2 | 18 | 3.1 |
| | 20-24 | 18 | 14.9 | 37 | 17.9 | 53 | 21.1 | 108 | 18.7 |
| | 25-29 | 46 | 38.0 | 75 | 36.2 | 86 | 34.3 | 207 | 35.8 |
| | 30-34 | 36 | 29.8 | 60 | 29.0 | 56 | 22.3 | 152 | 26.3 |
| | 35+ | 17 | 14.1 | 29 | 14.0 | 48 | 19.1 | 94 | 16.2 |
| Income | $\bar{x}$ (95% CI) | 399.5 | (319.0 480.0) | 545.8 | (460.2 631.4) | 424.5 | (362.9 486.0) | 453.7 | (411.4 495.9) |
| (KD*/mo) | <400 | 60 | 49.6 | 61 | 38.1 | 116 | 47.2 | 237 | 45.0 |
| | 400-600 | 21 | 17.4 | 30 | 18.8 | 43 | 17.5 | 94 | 17.8 |
| | 601-1000 | 24 | 19.8 | 42 | 26.3 | 56 | 22.8 | 122 | 23.2 |
| | 1001-1999 | 14 | 11.6 | 23 | 14.4 | 29 | 11.8 | 66 | 12.5 |
| | 2000+ | 2 | 1.7 | 4 | 2.5 | 2 | 0.8 | 8 | 1.5 |
| Employment | None | 53 | 43.8 | 82 | 42.7 | 113 | 44.8 | 248 | 43.9 |
| | Technical | 2 | 1.7 | 18 | 9.4 | 17 | 6.8 | 37 | 6.6 |
| | Professional | 23 | 19.0 | 50 | 26.0 | 63 | 25.0 | 136 | 24.1 |
| | Manager/Doctor/Lawyer | 7 | 5.8 | 11 | 5.7 | 8 | 3.2 | 26 | 4.6 |
| | Retired | 36 | 29.8 | 31 | 16.2 | 51 | 20.2 | 118 | 20.9 |
| Nationality | Kuwaiti | 81 | 66.9 | 127 | 61.7 | 181 | 71.5 | 389 | 67.1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Permanent Resident (*Bedoon*) | 14 | 11.6 | 16 | 7.8 | 19 | 7.5 | 49 | 8.5 |
| | Levant Other | 15 | 12.4 | 31 | 15.1 | 33 | 13.0 | 79 | 13.6 |
| | Other | 11 | 9.1 | 32 | 15.5 | 20 | 7.9 | 63 | 10.9 |
| Marital Status | Single | 7 | 5.8 | 25 | 11.8 | 40 | 15.8 | 72 | 12.3 |
| | Married | 88 | 72.7 | 162 | 76.4 | 176 | 69.6 | 426 | 72.7 |
| | Divorced | 15 | 7.4 | 9 | 7.1 | 14 | 5.5 | 38 | 6.5 |
| | Widowed | 17 | 14.1 | 10 | 4.7 | 23 | 9.1 | 50 | 8.5 |
| Total | | 121 | 20.5 | 215 | 36.5 | 253 | 43.0 | | |

*1 KD=$3.63 US

**Table 2 Descriptive Results from the Study Cohorts: Residence During War, Physical and Psychological Health, and *Owzla* (Alienation)**

| Measure | Range | Breast Cancer | | Screening | | Control | | Total | |
|---|---|---|---|---|---|---|---|---|---|
| | | N=121 | | N=215 | | N=253 | | N=589 | |
| | | n | % | n | % | n | % | n | % |
| Physical Health | 0-20 | 76 | 62.8 | 99 | 51.6 | 156 | 62.7 | 331 | 58.9 |
| | 21-40 | 43 | 35.5 | 70 | 36.4 | 73 | 29.3 | 186 | 33.1 |
| | 40+ | 2 | 1.65 | 23 | 12.0 | 20 | 8.03 | 45 | 8.01 |
| Residence During War (months) | 0-4 | 24 | 20.9 | 21 | 26.3 | 33 | 20.9 | 78 | 22.1 |
| | 5-8 | 9 | 7.83 | 8 | 10.0 | 20 | 12.7 | 37 | 10.5 |
| | 9-13 | 27 | 23.5 | 12 | 15.0 | 24 | 15.2 | 63 | 17.9 |
| | 14-16 | 55 | 47.8 | 39 | 48.8 | 81 | 51.3 | 175 | 49.6 |
| PTSD | 0-21 | 15 | 22.1 | 15 | 25.9 | 39 | 39.4 | 69 | 30.7 |
| | 22-45 | 41 | 60.3 | 34 | 58.6 | 54 | 54.6 | 129 | 57.3 |
| | 46+ | 12 | 17.7 | 9 | 15.5 | 6 | 6.06 | 27 | 12.0 |

| Measure | Sub-scale | Breast Cancer | | Screening | | Control | |
|---|---|---|---|---|---|---|---|
| | | $\bar{x}$ | 95% CI | $\bar{x}$ | 95% CI | $\bar{x}$ | 95% CI |
| Mental Health | Emotional | 64.5 | 61.6-67.5 | 69.8 | 66.8, 72.8 | 75.2 | 73.2, 77.2 |
| | Cognitive | 63.2 | 60.3, 66.1 | 65.7 | 62.2, 69.1 | 71.9 | 69.7, 74.0 |
| | Role | 84.1 | 81.9, 86.3 | 85.1 | 82.5, 87.6 | 88.0 | 86.4, 89.7 |
| | Pain | 60.0 | 56.2, 63.7 | 59.0 | 54.7, 63.2 | 56.7 | 53.7, 59.6 |
| *Owzla* | Trust | 96 | 90, 103 | 86 | 79, 93 | 87 | 82, 93 |
| | Government | 47 | 39, 54 | 43 | 37-50 | 42 | 37, 47 |
| | Social Support | 49 | 44, 55 | 50 | 45-56 | 52 | 48, 56 |
| | Future | 47 | 40, 54 | 50 | 43, 57 | 45 | 40, 50 |

Table 3. Unadjusted, Adjusted and Coefficient for Logisitc Regression models predicting the odds of breast cancer in Kuwaiti women compared to their healthy female peers

| | Unadjusted OR (95% CI) | | P>\|z\| | Adjusted OR (95% CI) | | P>\|z\| | Estimated Regression Coefficient |
|---|---|---|---|---|---|---|---|
| Characteristic | n=374 | | | | | | |
| Intercept | | | | | | | 1.90 (z=0.46) |
| Age, yrs *(ref. <25)* | | | | | | | |
| 25-34 | 0.78 | 0.23-2.65 | 0.70 | 0.35 | 0.09-1.29 | 0.12 | |
| 35-44 | 2.27 | 0.78-6.61 | 0.13 | 1.42 | 0.44-4.53 | 0.56 | |
| 45-54 | **3.34** | **1.19-9.37** | **0.02** | 2.04 | 0.66-6.31 | 0.22 | |
| 55-64 | **3.24** | **1.10-9.54** | **0.03** | 1.82 | 0.56-5.96 | 0.32 | |
| 65+ | 2.22 | 0.57-8.68 | 0.25 | 0.51 | 0.10-2.54 | 0.42 | |
| Ethnicity *(ref. Kuwaiti)* | | | | | | | |
| Bedoon | 1.65 | 0.79-3.45 | 0.19 | | # | | |
| Arab | 1.02 | 0.52-1.97 | 0.96 | | # | | |
| Other | 1.23 | 0.56-2.68 | 0.61 | | # | | |
| Education, yrs *(ref. primary)* | | | | | | | |
| 4-8 | 1.52 | 0.51-4.47 | 0.45 | **3.17** | **0.98-10.3** | 0.05 | |
| 9-12 | 0.78 | 0.27-2.27 | 0.65 | 1.97 | 0.60-6.48 | 0.27 | |
| 13-16 | 0.78 | 0.26-2.31 | 0.66 | **3.09** | **0.87-11.0** | 0.08 | |
| 16+ | 1.26 | 0.44-3.59 | 0.66 | **5.85** | **1.66-20.6** | 0.01 | |
| BMI *(ref. <20)* | | | | 0.97 | 0.93-1.01 | 0.18 | |
| 20-24 | 0.68 | 0.18-2.53 | 0.56 | | # | | |
| 25-29 | 1.07 | 0.31-3.74 | 0.92 | | # | | |
| 30-34 | 1.29 | 0.36-4.58 | 0.70 | | # | | |
| 35+ | 0.71 | 0.19-2.66 | 0.61 | | # | | |
| Marital Status *(ref. single)* | | | | | | | |
| Married | 2.86 | 1.23-6.64 | 0.02 | | # | | |
| Divorced | 3.67 | 1.15-11.7 | 0.03 | | # | | |
| Widowed | 4.22 | 1.52-11.7 | 0.01 | | # | | |
| Family History of Cancer, yes *(ref. no)* | 0.47 | 0.30-0.74 | 0.00 | **0.35** | **0.20-0.59** | **0.00** | |
| Exercise, yes *(ref. no)* | 0.95 | 0.62-1.45 | 0.81 | | # | | |
| War Residence, months 1990-1991 *(ref. 0-4)* | | | | | | | |
| 5-8 | 0.63 | 0.27-1.47 | 0.29 | 0.61 | 0.23-1.61 | 0.32 | |
| 9-16 | 1.30 | 0.72-2.32 | 0.38 | 1.35 | 0.67-2.73 | 0.41 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Employment *(ref. unemployed)* | | | | | | |
| Unskilled | 0.25 | 0.06-1.13 | 0.07 | | # | |
| Skilled | 0.78 | 0.44-1.39 | 0.40 | | # | |
| Professional | 1.87 | 0.64-5.41 | 0.25 | | # | |
| Retired | 1.50 | 0.88-2.58 | 0.14 | | # | |
| Income | | | | | | |
| 1 | 0.83 | 0.51-1.35 | 0.45 | 0.63 | 0.33-1.19 | 0.16 |
| 2 | 0.92 | 0.46-1.86 | 0.83 | 0.69 | 0.29-1.62 | 0.39 |
| 3 | 1.91 | 0.26-13.9 | 0.52 | 0.80 | 0.10-6.73 | 0.84 |
| Mental Health | | | | | | |
| Emotional | **0.96** | **0.94-0.97** | 0.00 | | # | |
| Cognitive | **0.97** | **0.96-0.98** | 0.00 | | # | |
| Role | **0.98** | **0.96-0.99** | 0.01 | **0.97** | **0.94-0.99** | **0.00** |
| Social | **0.99** | **0.99-1.00** | 0.00 | | | |
| Traumatic Event *(yes, ref. no)* | **1.89** | **1.22-2.93** | 0.01 | **1.94** | **1.18-3.19** | **0.01** |
| *Owzla* | 1.24 | 0.86-1.78 | 0.25 | **1.58** | **0.96-2.62** | **0.07** |
| Trust | **1.01** | **1.00-1.01** | 0.03 | **1.01** | **1.00-1.01** | **0.10** |
| Government | 1.00 | 1.00-1.01 | 0.27 | | | |

*kd=3.55 US dollars (October 2012 rate)
All the boldface values indicate statistical significance at P<0.10.
#Did not enter full regression model because P value >0.10

Table 4. Unadjusted, Adjusted and Coefficient for Logisitc Regression models predicting the odds of Breast Cancer compared to Kuwaiti females seeking screening

| | Unadjusted OR (95% CI) | | P>\|z\| | Adjusted OR (95% CI) | | P>\|z\| | Estimated Regression Coefficient |
|---|---|---|---|---|---|---|---|
| Characteristic | n=313 | | | | | | |
| Intercept | | | | | | | -3.15 |
| Age, yrs *(ref. <25)* | | | | | | | |
| 25-34 | 1.02 | 0.28-3.69 | 0.97 | 0.54 | 0.11-2.76 | 0.46 | |
| 35-44 | 1.20 | 0.40-3.60 | 0.75 | 0.66 | 0.15-2.88 | 0.58 | |
| 45-54 | **2.36** | **0.81-6.90** | **0.12** | 1.19 | 0.27-5.25 | 0.82 | |
| 55-64 | **3.93** | **1.24-12.4** | **0.02** | 1.79 | 0.36-8.80 | 0.47 | |
| 65+ | 2.74 | 0.62 -12.1 | 0.18 | 1.50 | 0.19-11.6 | 0.70 | |
| Ethnicity *(ref. Kuwaiti)* | | | | | | | |
| Bedoon | 1.37 | 0.64-2.96 | 0.42 | | # | | |
| Arab | 0.76 | 0.39-1.49 | 0.42 | | # | | |
| Other | 0.54 | 0.26-1.13 | 0.10 | | # | | |
| Education, yrs *(ref. primary)* | | | | | | | |
| 4-8 | 2.51 | 0.84- 7.51 | 0.09 | **3.40** | **0.87-13.2** | **0.08** | |
| 9-12 | 1.03 | 0.36-2.97 | 0.96 | 1.80 | 0.46-7.04 | 0.40 | |
| 13-16 | 1.51 | 0.50-4.52 | 0.46 | 2.37 | 0.58-9.63 | 0.23 | |
| 16+ | 1.18 | 0.42-3.31 | 0.32 | 2.47 | 0.62-9.63 | 0.20 | |
| BMI *(ref. <20)* | | | | 0.98 | 0.93-1.03 | 0.46 | |
| 20-24 | 0.73 | 0.18-2.91 | 0.66 | | # | | |
| 25-29 | 0.92 | 0.25-3.43 | 0.90 | | # | | |
| 30-34 | 0.90 | 0.24-3.41 | 0.88 | | # | | |
| 35+ | 0.88 | 0.22-3.56 | 0.86 | | # | | |
| Marital Status *(ref. single)* | | | | | | | |
| Married | 1.94 | 0.81-4.67 | 0.14 | 1.73 | 0.57-5.28 | 0.34 | |
| Divorced | 2.14 | 0.66-6.95 | 0.20 | 1.99 | 0.45-8.89 | 0.37 | |
| Widowed | 6.07 | 1.93-19.1 | 0.00 | **5.31** | **1.25-22.5** | **0.02** | |
| Family History of Cancer, yes *(ref. no)* | 0.79 | 0.50-1.26 | 0.33 | **0.51** | **0.29-0.90** | **0.02** | |
| Exercise, yes *(ref. no)* | 0.80 | 0.51-1.26 | 0.34 | **2.02** | **1.11-3.66** | **0.02** | |
| War Residence, months 1990-1991 *(ref. 0-4)* | | | | | | | |
| 5-8 | 1.54 | 0.63-3.77 | 0.35 | 1.39 | 0.55-4.23 | 0.57 | |
| 9-16 | **1.89** | **1.06-3.37** | **0.03** | 1.52 | 0.74-3.15 | 0.26 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Employment *(ref. unemployed)* | | | | | | |
| Unskilled | **0.25** | **0.06-1.13** | **0.02** | | # | |
| Skilled | 0.78 | 0.44-1.39 | 0.27 | | # | |
| Professional | 1.87 | 0.64-5.41 | 0.98 | | # | |
| Retired | **1.50** | **0.88-2.58** | **0.05** | | # | |
| Income (*ref. <800 kd*/mo.*) | | | | | | |
| 800-1500 | **0.56** | **0.33-0.94** | **0.03** | 0.61 | 0.31-1.22 | 0.16 |
| 1501-2200 | 0.61 | 0.29-1.28 | 0.19 | 0.60 | 0.23-1.54 | 0.29 |
| 2200+ | 0.50 | 0.09-2.82 | 0.43 | 0.63 | 0.10-3.92 | 0.62 |
| Mental Health | **1.58** | **1.07-2.31** | **0.05** | **1.54** | **1.12-2.30** | **0.03** |
| Traumatic Event *(yes, ref. no)* | **2.17** | **1.38-3.41** | **0.00** | **1.23** | **1.08-1.83** | **0.46** |
| *Owzla* | 1.06 | 0.86- 1.31 | 0.67 | **0.94** | **0.48-1.83** | **0.85** |
| Trust | **1.01** | **1.00-1.01** | **0.00** | **1.01** | **1.00-1.02** | **0.06** |
| Government | 1.00 | 1.00-1.01 | 0.42 | 1.00 | 1.00-1.01 | 0.41 |

*kd=3.55 US dollars (October 2012 rate)
All the boldface values indicate statistical significance at P<0.10.
#Did not enter full regression model because P value >0.10

Table 5. Unadjusted, Adjusted and Coefficient for Logisitc Regression models predicting the odds of Kuwaiti women seeking breast cancer screening compared to healthy female controls

| | Unadjusted OR (95% CI) | | P>\|z\| | Adjusted OR (95% CI) | | P>\|z\| | Estimated Regression Coefficient |
|---|---|---|---|---|---|---|---|
| Characteristic | n=441 | | | | | | |
| Intercept | | | | | | | **-2.50** |
| Age, yrs *(ref. <25)* | | | | | | | |
| 25-34 | 0.77 | 0.35-1.69 | 0.51 | 0.78 | 0.24-2.54 | 0.68 | |
| 35-44 | **1.89** | **0.92-3.90** | **0.08** | 2.05 | 0.69-6.09 | 0.20 | |
| 45-54 | 1.41 | 0.69-2.90 | 0.35 | 1.80 | 0.60-5.39 | 0.29 | |
| 55-64 | 0.83 | 0.36-1.87 | 0.65 | 1.09 | 0.33-3.66 | 0.88 | |
| 65+ | 0.81 | 0.26-2.46 | 0.71 | 0.64 | 0.12-3.39 | 0.60 | |
| Ethnicity *(ref. Kuwaiti)* | | | | | | | |
| Bedoon | 1.20 | 0.59-2.42 | 0.61 | 0.99 | 0.46-3.28 | 0.69 | |
| Arab | 1.34 | 0.78-2.30 | 0.29 | 1.04 | 0.45-2.39 | 0.93 | |
| Other | **2.28** | **1.25-4.17** | **0.01** | **3.26** | **1.21-8.74** | **0.02** | |
| Education, yrs *(ref. primary)* | | | | | | | |
| 4-8 | 0.60 | 0.24-1.49 | 0.27 | | # | | |
| 9-12 | 0.76 | 0.33-1.74 | 0.52 | | # | | |
| 13-16 | 0.52 | 0.22-1.23 | 0.14 | | # | | |
| 16+ | 1.07 | 0.47-2.43 | 0.88 | | # | | |
| BMI *(ref. <20)* | | | | 0.98 | 0.94-1.02 | 0.27 | |
| 20-24 | 0.93 | 0.30-2.91 | 0.90 | | # | | |
| 25-29 | 1.16 | 0.39-3.50 | 0.79 | | # | | |
| 30-34 | 1.43 | 0.47-4.38 | 0.53 | | # | | |
| 35+ | 0.81 | 0.25-2.56 | 0.71 | | # | | |
| Marital Status *(ref. single)* | | | | | | | |
| Married | 1.47 | 0.86-2.54 | 0.16 | | # | | |
| Divorced | 1.71 | 0.71-4.15 | 0.23 | | # | | |
| Widowed | 0.70 | 0.28-1.70 | 0.43 | | # | | |
| Family History of Cancer, yes *(ref. no)* | **0.60** | **0.41-0.88** | **0.01** | **0.87** | **0.54-1.41** | **0.56** | |
| Exercise, yes *(ref. no)* | 1.17 | 0.81-1.69 | 0.40 | | # | | |
| War Residence, months 1990-1991 *(ref. 0-4)* | | | | | # | | |
| 5-8 | **0.41** | **0.21- 0.79** | **0.01** | 0.45 | 0.17-1.23 | 0.12 | |
| 9-16 | **0.68** | **0.44-1.07** | **0.09** | 1.20 | 0.53-2.72 | 0.65 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Employment *(ref. unemployed)* | | | | | # | |
| Unskilled | 1.46 | 0.71-3.00 | 0.31 | | # | |
| Skilled | 1.09 | 0.69-1.75 | 0.71 | | # | |
| Professional | 1.89 | 0.73-4.92 | 0.19 | | # | |
| Retired | 0.84 | 0.49-1.42 | 0.51 | | # | |
| Income (*ref. <800 kd*/mo.*) | | | | | | |
| 800-1500 | **1.49** | **0.96-2.31** | **0.08** | 1.30 | 0.75-2.25 | 0.350 |
| 1501-2200 | 1.52 | 0.82-2.82 | 0.19 | 1.45 | 0.70-3.00 | 0.320 |
| 2200+ | 3.83 | 0.68-21.4 | 0.13 | 3.66 | 0.60-22.3 | 0.160 |
| Mental Health | 1.59 | 1.20-2.11 | **0.00** | **1.70** | **1.25-2.32** | **0.00** |
| Traumatic Event *(yes, ref. no)* | 0.87 | 0.60-1.27 | 0.47 | | # | |
| *Owzla* | 1.12 | 0.83-1.51 | 0.45 | 1.37 | 0.81-2.32 | 0.24 |
| Trust | **1.00** | **0.99-1.00** | **0.09** | 1.00 | 0.99-1.01 | 0.94 |
| Government | 1.00 | 1.00-1.01 | 0.37 | 1.00 | 0.99-1.01 | 0.72 |

*kd=3.55 US dollars (October 2012 rate)
All the boldface values indicate statistical significance at P<0.10.
#Did not enter full regression model because P value >0.10

## Chapter 7
## Using Illness Narratives to Identify Community Perceptions of Trauma and Cancer Risk in Kuwait

In this chapter I describe how I employed my qualitative methods in Kuwait and I report the main results of this investigation. My project sought out Kuwaitis to discuss their unique and indigenous viewpoint on environmental and health issues related to the Gulf War. Herein I develop an ethnographic, public health-based approach by meeting with and interviewing key informants in the Kuwaiti medical and environmental communities sectors (i.e. Key Informant Interviews).

The methods in this chapter are concise and provide sufficient depth to investigate the issues at stake.[130] First, as discussed in Chapter 2, questions around war-related health issues incite data triangulation. This triangulation is indeed best accomplished by using qualitative methods for two reasons (Sandelowski 2000, Jick 1979). Anecdotal evidence collected through interviews and participant-observation allow the researcher to unearth the community's impressions and perceptions (Chapter 2). Secondly, qualitative methods tend to offer more explanation for the wider context of a problem such as the Gulf War,[131][132] and thereby condition and encourage the investigator to include diverse, underlying factors that may be sidelined or minimized in a purely quantitative analysis.

[130] While some of the qualitative methods may not be conventional in public health, I believe it is imperative that public health open its doors to other methodological approaches to answer questions that are not answerable with data sets or p-values.
[131] In Chapter 1, I explore the history and context of the Gulf War and possible health impacts in great detail.
[132] The reasons for this are more fully explained in Chapter 2.

Working in a foreign country and in foreign conditions requires the researcher to make constant adjustments to his or her research protocol (see Chapter 4). As a community outsider, I relied heavily on ethnography and participant observation, very common anthropologic tools of inquiry. In this chapter I identify the best approaches to answer my research questions, and indeed attempt to explain the myriad tools at one's disposal in this type of project.

This approach analyzed community health concerns in a qualitative way. As such I was able to conduct many interviews within the environmental and health communities on individuals' perceptions and concerns regarding cancer and particularly breast cancer risk in Kuwait after the Gulf War. In this chapter, I am posing the following question: does the Kuwaiti environmental health[133] community believe that there are psychosocial (e.g. trauma, alienation) and chemical factors that influenced and/or exacerbated the advent of breast cancer in post-war Kuwait? This question is posed in a context where the State controls the public dissemination of information regarding cancer risks.

I also explain my recruitment methods detailing the population, who the participants are, how they were selected, the linguistic rapport between participant and researcher, informed consent, and the questions on the interview guide.

**Qualitative Methods: A *Muwahaja*-based Approach**

Abu-Lughod implores researchers to consider the relationship between individual encounters and the larger statements that researchers weave when drafting generalizations from their subjects "showing their actual circumstances and detailed histories" (Abu-Lughod 2006: 476). One can imagine piecing together these histories into a collective memory. Post-conflict, participatory principles (Eytan 2004; Pham 2004) encourage the researcher to empower their subjects by adopting a more passive role, acutely listening and, when useful, providing feedback to the respondent. This approach includes ethnographic research I conducted using informal interviews with doctors, patients and family members.

When I first went to Kuwait in 2007 my goal was to meet people and listen to their disease narratives with few preconceptions. Many public health experts believe post-conflict public health impacts originate from small increases in individual risks distributed across populations (HSPH 2005). The inherent interconnectedness between epidemiology and anthropology became evident through my research on the Kuwaiti population during this project (Barbosa 1998, DiGiaccomo 1999). I was continually carrying out my research plan in a culturally sensitive way while maintaining a rigorous qualitative methodology. To this extent, my project strived to reach out to civilians who traditionally may not be identified as victims of armed conflict. Indeed, most war-focused public health research does not focus on civilians. "Reaching out" means communicating with

patients on their level and on their terms, for example avoiding questions filled with medical jargon (Abu Lughod 2006). This concept will be further delinated while discussing explanatory models in the following section.

My fieldwork data were collected in this study via participant-observation and semi-structured interviews with participants from the Kuwait environmental health community and a few obreast cancer patients in Kuwaiti clinics.

In the semi-structured patient interviews,[134] I relied on participants' explanations of the community's diseases. As Kleinman defined explanatory models, participants often bring their own interpretation of the illness' origin (Kleinman 1988). I encouraged the study participants to be actively engaged in the project from its onset. The role of the participants in helping craft the present research question was unpacked in Chapter 4. Thus, two approaches informed my interactive approach during unstructured interviews: disease narratives and explanatory models (Bernard 2002, Abramovitz 2005, Henry 2006). These interviews and my transcribed field notes shed light on participants' health and how they cope with changing health status in their own terms. In the pilot phase five years ago, many patients had commented on links of their illness to the chemical fallout from the war. Moreover, the study was conducted in such a way that the participant often learned something new about the disease, environmental degradation and/or their personal context in relation to the war.

[134] These interviews were part of a larger, Quality of Life survey of chronic disease patients in Kuwait.

This participatory approach validates the patient's lived experience and their disease narrative. I pursued these narratives in informal clinical and non-clinical sites as inspired by the *muwahaja* approach in Islamic legal tradition (Messick 1993). *Muwahaja* represents the face-to-face mediation and resolution of complaints. Through this approach, my participants encouraged me to revise my own perceptions of Kuwaiti medical knowledge. More specifically, they wished that I address how medical knowledge is produced, by whom and why the release of this knowledge would be obfuscated following armed conflict. According to the popular press, the Kuwaiti State has been defining disease risk for the public both at the individual and societal levels (Kuwait Times 2008, Parliament 2011).

**Piecing Together Kuwaiti Memories: Narrative Analysis and Explanatory Models**

Many anthropologists have reached a consensus that the most efficacious methods for healing traumatized individuals involve "talking openly about their pain and suffering" (Abramowitz 2005; Henry 2006).[135] Participant narratives, collected on an individual basis, inform the researcher to better trace the path of illness: When did the illness first present? Was there a life change that

[135] Indeed, many countries have established Truth and Reconciliation Commissions which are official bodies who record and synthesize victims' and perpetrators narratives, in order to encourage a national dialog wherein traumatic narratives are unearthed (Hayner 1994; Helman 2000). These narratives seek to break through the institutional "wall of silence" such that the country will later be able to move forward and reach national reconciliation (Helman 2000). These commissions have brought a sense of community justice to Rwanda, Yugoslavia, Morocco, and South Africa, among others, following great societal transformation and trauma (Helman 2000; Hayner 1994). Yet, such a commission would probably prove to be quite difficult to implement in Kuwait. Again, taking into consideration local issues of honor and family pride, I do not think that many individuals would be willing to come forward and testify about their traumatic experiences.

provoked these symptoms? Essentially a good clinician knows how to listen and record the medical history, and more importantly, the trajectory of his or her patient. The participant will recount usually in a piecemeal fashion, the putative causes of illness, and by establishing points of reference between the body, self and society, be able to later reconstitute his health that has often been shattered by illness (Henry 2006; Williams 1984). Moreover narrative reconstruction engages and exposes the "discursive consciousness" (William 1984). In some cases, these narrative-based discussions may lead to partial explanatory models.

Interestingly, participant perceptions may include supernatural or social reasonings to explain his or her illness. In Kuwait, many patients have cited "God willed it so,"[136] or "that came from above," as rationale for their symptoms. Many believed that the best cure was adopting a more pious lifestyle and making the obligatory pilgrimage to Mecca. As Kleinman outlined in his seminal volume on explanatory models, *The Illness Narratives*, patients often bring their own interpretation of their illness' etiology to the clinic (Kleinman 1988). For many Kuwaitis, contrary to Americans, they will explain that God has willed it such; these patients defer to religion as an explanation for their disease. Indeed Islam may offer identity, courage, pride, continuity, and hope to suffering patients (Hassan 2008; Ali 1995). Like most religions, Islam deems that individuals are more than mind and body, but also spirit and soul. The researcher should thus be prepared to contend with the piety of the patients with whom s/he relates. In deference to these religious codes, I adopted a courteous manner in my

[136] I am translating from comments wherein *Allah* was cited for God.

interview style. Any such exchange with informants should encourage a rapport of openness, free of prejudice while listening to gut impressions and feelings (Kleinman et al 1978).

A micro-macro mix, as described earlier in Chapter 2, would include data from both the individual informant in concert with information about the informant's context, normally social and political processes operating to influence broader health care issues. I have sought to employ interviews in my research because my dissertation examines how violence becomes embodied. By "embodied" we mean that the individual has experienced so much violence, that the violence has caused insults to his/her bodies in ways that may not be obvious (Scheper-Hughes 1992, Krieger 1999). In other words, this violence may lead to health consequences in later life.

**Recruitment Methods**

From the most recent Kuwait visit, I gathered participants based on the targeted snowball method (i.e. asking others for suggested participants, and in turn asking participants for suggestions of other participants, etc) (Mason and Harrison 1994). The snowball method enabled us to overcome difficulties recruiting Kuwaitis "off the street," where perceptions of a foreign researcher may impede recruitment. Also, discussing the war and its consequences is a slightly sensitive topic, one that many may not want to engage if there is not a proper introduction. The issue of trust and building rapport was covered at great length in Chapter 4. The first couple participants were recommended to me by

colleagues at American University of Kuwait. My colleagues provided either email or phone numbers for these potential participants.

I believe that the best way to understand alienation and collective trauma, my major outcomes, is by examining the lived experience of Kuwaitis, over 95% of whom, were Gulf War survivors. These survivors possess vivid memories about war-time experiences from which we can extrapolate a more general view on Gulf War trauma, PTSD, spirituality and chronic disease in the post-conflict period. Therefore, participants must have lived the majority of their lives in Kuwait and were familiar with and interested in medical or environmental issues or both. By “familiar with” we are referring to their acquired expertise, either through formal education, their own lived experience or both. By “interested in” we are referring to their demonstrated knowledge, ideas, insights into the connections between increased rates of diseases and chemical and psychosocial exposures (e.g. torture, POWs) from the Gulf War. During the recruitment process, the researcher did not solicit the participant credentials such that many autodidacts were invited to participate as well.

The environmental health community was defined broadly (i.e. inclusion criteria) as individuals educated and/or concerned by environmental health, health and toxicological issues in Kuwait since the Gulf War. These individuals included professionals, students, providers, advocates, patients, NGO workers, government officials and employees, academics, and laborers. For example, many worked in an environmental NGO or they worked in a hospital or in the

government. Patients were able to express their lived experience both having succumbed to disease and having lived through the war exposures. Additionally, per the IRB's application, they must have been between 18-85 years old.

As explained above, we practiced active listening techniques. For example, if you ask the patient a question and he or she does not answer this question, but rather returns to an earlier question, you, the researcher, should follow his or her train of thought. If the patient wants to avoid scrutiny from his or her family, we proposed to meet at another time or place away from the family. A good researcher is responsive to his or her participants' perceptions and level of participation. Naturally, as I was speaking in the local language (Kuwaiti Arabic), I was very effective in establishing rapport with the participants. As I conducted my research, I spoke in Arabic and English with my participants. For subjects who are not fluent in English, I hired a part-time interpreter to assist me during the survey process.[137] It was critical to establish linguistic rapport with the respondents as well as other family members who may also have experienced similar health issues.

[137] In other words, all transcripts were in English.

Table 1. Types of Key Informants by Sector

| Sector | Number of Individuals | Interest in Environmental Issues | Interest in Health Issues |
|---|---|---|---|
| NGOs | 6 | 4 | 2 |
| Governmental | 6 | 2 | 4 |
| Private | 4 | 2 | 2 |
| Academic | 6 | 3 | 3 |
| Patient | 4 | 2 | 2 |
| Total | 26 | 13 | 13 |

Twenty-six Kuwaiti community members, roughly balanced between NGOs, academia, patients and government, were invited to participate in the face-to-face interviews (Table 1). The interviews I conducted lasted between 45-90 minutes each and I conducted each. The interviews were conducted in a mutually agreed-upon location. Before the interview each community member received the list of questions and background information about the project (see Table 2; see consent form in Appendix). The questions asked about the effects of environmental pollution on health in Kuwait and how related decisions have

been made since the war on environmental clean-up. The interviewers audio-recorded the comments made during the interview using an electronic recording device. Later, the researcher transcribed these interviews.

Table 2. Interview Guide Questions

| The participants were asked the following questions (i.e. Interview Guide): |
| --- |
| 1a. Please describe what happened to Kuwait during the Gulf War in your view? |
| 1b. Do you think the war had any impacts on the environment or its stress on health? |
| 2. What changes have you noticed about the environment in Kuwait since the war? Is it contaminated? With what substances? |
| 3. How is health in Kuwait today? What cancer-related problems do you notice in Kuwait? Is the health of Kuwaitis better or worse now than before the war? |
| 4. Is the degraded environment related to increased cancer risk? If yes, does it affect breast cancer? Just how do you think this happened? |

As with any interview guide, the participant sometimes directed the conversation in another direction at his or her will. If answers were not clear, the researcher requested a second interview, the length of which will be at the participant's discretion. As part of the study's IRB approval, no demographic information were collected during these interviews and the participants' names were changed to protect their privacy (UW IRB 2010). The interviews were transcribed from the recordings. Then I analyzed the transcriptions by reading through them several times and identifying by hand the key themes that emerged from the data. With these themes in mind, I collected the relevant quotes for this synthesis.

**Presentation of Results**

My theoretical framework for my dissertation is the life course approach.[138] In presenting the results I will first review some of the relevant literature about the topics about which I am most interested. Then, I will present the citations from interviewees that seem best to expose the connections between the emergent themes and the theory. Lastly, I will provide a discussion of each theme in the Discussion section.

In his tome *Everything In Its Path*, Kai Erikson developed the notion of *collective trauma*, as described earlier in Chapter 3. Helman notes that PTSD is a major indicator of collective trauma following violent conflict (Helman 2000). Indeed, other studies have shown that PTSD-affected individuals have higher levels of social alienation and reported lower self-assessed health (Ginzburg et al. 2003, Adams 2005, Salick & Auerbach 2006). In my interviews I wanted to explore the issue of stress and trauma. I put more emphasis on stress here because in Kuwait "trauma" is not a known concept.[139] While mental health practitioners, most of whom were trained in the West, are quite familiar with trauma, from the in-clinic interviews conducted for Chapter 6, there was little to no background knowledge among the participants of what trauma entails and if it has affected a certain segment of Kuwait society.

[138] Most epidemiological studies do not focus on disease development or progression over the life course. Rather, there is an emphasis on linking one exposure to one outcome. As we learn more about chronic disease development, it has become more and more evident that diseases develop from several causes, particularly during the critical period of one's life (i.e. a transformative event such as a war). These myriad exposures interact with one's genetic predispositions and will trigger physical and psychological disease.

[139] "Trauma" is of Germanic origin--it has not yet permeated the Kuwaiti lexicon. The concept of stress, however, is established in this study.

## Results

*Everybody's talking about the chemicals, even in the newspaper. Fish wash up on the shore in mass, dead. We've never seen this before in the history of Kuwait, seen things, like diseases, that we were not familiar with before.* –Hoda, Former Diplomat

### Collective Trauma: Violence Embodied

Collective trauma was the first of three common themes that concerned many of my interviewees in the post-conflict period. In this theme, the delicate balance between mental and physical health and how these two states inform each other for cancer patients. If one feels *out of balance* because of war-related effects, either physically or mentally, the other state may suffer as well—leading to embodiment. Another factor that leads to individual-level alienation, specifically for Kuwait, is physical vulnerability (Pepin-Wakefield 2008). Together, these factors promote self-alienation in Kuwaitis, and summarily influence poorer health-related behaviors (e.g. addictions, partner violence) (Adams 2005, Mol 2006). These behaviors may be tied to feelings of social disintegration, stress and trauma that were expressed in several interviews:

*The War affected all of us, all who were here. Everyone in Kuwait is marked in some way. –Sara Akbar, Environment Interest*

When I first met Wael, the most remarkable thing about him was his stutter. Although he didn't enunciate it, most likely the stutter is a result of the trauma of this one event.

*I was on the roof to get water from the tank and all of a sudden a bullet whizzed by my face. It was 2 inches from my hitting my nose. My two brothers were taken as POWs. One was eventually returned, the other never did. –Wael, Environment Interest*

The other piece to Wael's comment is that the war was a very tangible, something palpable in the Kuwaiti existence. Wael comes from an upper-middle class family, well-educated. The Iraqis were not targeting certain social classes or certain groups of individuals. Rather, as a small country, with a small local population, many individuals were affected.

*There were many, many horrible things that happened (during the war). The Iraqis used to torture our men for days, weeks even, in secret rooms throughout the country. When they came back, they were messed up forever. –Selma, Health Sector*

*You couldn't go out; the Iraqis were everywhere. Terrorizing people, absolutely, and shooting, and the killing, and raping and stealing everything, I mean brutal terrorism. Suddenly, a bomb went off near the area where I was living. And we ran to the basement and once there, I passed out. I felt something warm coming up my leg and when it reached my heart I passed out completely, and of course, we had gas masks. I thought, 'if I pass out, how am I going to help my children (put on the masks)? I'd better get out' So I had my car and headed to the Saudi border. Once we got there, I couldn't pass. They wouldn't let me pass. "Go*

*back!" the guard barked at me with (his) gun in my face. "Go back!" –Wadha, Health Interest*

As noted above, nearly all Kuwaitis were affected by an intense dose of trauma. While some individuals might not have been directly exposed, for example, to torture, or in some way shielded from its effects, the long-term effects on Kuwaiti health have not been publicly studied. Indeed, the rates of PTSD have stayed the same in Kuwait since 1991 (~20% of Kuwaitis), which seems to suggest many individuals have not recovered from these atrocious events (Hammadi 2011). Before 1991, less than 10% of Kuwaitis were affected by PTSD (KMoH 1995). As Selma cites in her interview, there is a sense of the Kuwaiti psyche before and after the war. In the before period, there was a relatively good time, people were enjoying new freedoms, many Kuwaitis were traveling abroad to the West for their higher education or for leisure. For many Kuwaitis I interviewed,[140] however, the post-war period is a darker time, a more severe time where a group of individuals was forcibly expelled from the country (i.e. 400,000 Palestinians[141]) and new groups of individuals were brought in, and in my everyday discussions with Kuwaitis there was a large amount of suspicion toward these individuals—and, indeed, towards most foreigners in general.

I heard many such stories of despair and horror during my fieldwork in Kuwait. In general there appears to have been a massive amount of physical and psychological torture that occurred during the occupation. Torture, along

[140] Based on my impressions from these interviews, and other interactions with colleagues and friends in Kuwait.
[141] While a few thousands stayed, the rest never returned.

with childhood sexual abuse, are probably some of the worst types of trauma. In the appendix to Chapter 1, I cited some of the more public cases of torture that were documented. I did not inquire about torture unless the participant was willing to discuss the matter because it can be a trigger for a psychological response[142]. Perhaps for now, it is most important to reiterate that the amount of suffering and stress were very high, and that in 1991 the average Kuwaiti felt like their world was coming to an end (Hassan 2008). While it is quite normal to let such events go unspoken at present, the body does not forget (Scheper-Hughes 2002, Chirot 2012). And indeed, the scars of the trauma may only come to the surface many years later, either as pathological behavior or a physical outcome (Chirot 2002, Abramovitz 2005).

**Discussion (Theme 1)**

These trauma and stress-related quotes demonstrate a sensitivity to the embodied being with a particular life meaning (Van Manen 2010). Capturing life meaning integrates political, economic and historical approaches by examining structural, contextual factors as they pertain to health outcomes (Morgan 1987, Morsy 1990, Baer 1996). For many Westerners, with the obvious exception of deployed soldiers, it would be difficult to conceptualize the Gulf War experience as we have not lived through such an event. As Wael and Sara pointed out in their testimonies, the mind became another battlefield, of the war, especially at a time when individuals often did not feel in control of their own circumstances and, indeed, their own bodies (Nordstrom & Robben 1995, Petryna 2002). Perhaps it

[142] After all, I am not a clinical psychologist.

is this fatalistic tendency, very prevalent in the Middle East, combined with a sense of massive, collective trauma, now 20 years comfortably settled in the country' consciousness. These dual issues have likely played a role in wreaking havoc on Kuwaiti health.

**A Toxic Legacy: War and Chemical Exposures**

During the Gulf War, there was no doubt Kuwait sustained irreparable damage as a result of the massive oil well fires that plagued the country for nine months. Also the US deployed depleted uranium munitions as a fail-proof anti-tank measure during the war. Here I will cite some portions of the interviews (see Guide) that focused on the notion of Gulf War pollution and disease etiology (theme 2):

*We know it's coming, a new diagnosis, from Iraq and oil (well fires), we know, but we not going to be normal again. –Hoda, Former Diplomat*

*I expect that there are only two reasons: radiation or pollution. An American doctor came to visit Ibn Sena Hospital and they came here for a gear check-up, and found a huge (amount of) radiation in Kuwait after the Gulf War. --Sara*

*After the Gulf and Iranian Wars, the food, especially fish, was a problem. They polluted our land, air and sea. We found ourselves sniffing, eating and living in a polluted environment. –Mohamed, Health Background*

Sara cites the "American" source because this lends legitimacy to her claim. Others cites the environment-at large, for example, the fish. Indeed in many of my interviews, I heard individuals mention how the environment had gotten much worse since the war period. The 2001 "fish kill," although 10 years

after the war ceased, represents, at the least, a symbol of the continuing contamination and delayed clean-up, and general lack of vision that pervades Kuwaiti concern for the environment.

Moreover, Hoda cites pollution as a major cause of the rise of allergies and asthma, before honing in its role in carcinogenesis:

*Everybody has asthma these days, like my neighbors and my son. Other people have allergies and itching skin. It's so polluted, that what happened in 1991 and now, I'm 100% sure that it affects us: bombing, dead bodies, the chemicals absorbed in the soil. Some people are not talking about (cancer), but it's running like a flu now.*
*What's going on in Basra,[143] it's here. I mean, we're only one hour from Iraq, you know. It's in our surroundings. –Hoda, idem*

In these testimonials, each individual has evoked a change in disease rates that they feel are, at least partially,related to the war. "It's running like a flu now" or "every family has a case of cancer—which we didn't see before the war" is a common refrain I heard from my Kuwaiti participants. Patients present in clinic with cancer symptoms at a much higher rate in the post-conflict period. Moreover, these are educated individuals, so it is unlikely that they were not aware of screening or public health interventions before the war:

*One thing that I have noticed: cancer appears in larger amount now, like a crowd. Before the 1990 invasion, you didn't hear about this (cancer), it was not common. How strange is that? Now it has become rather commonplace. --Mohamed, Patient*

*We didn't see (cancer) before the Gulf War. I remember observing effects five years after the radiation bombs were deployed. I think this is the reason, and because of the oil burning. It was terrifying and it's a really embarrassing, new problem. I noticed the breast cancer statistics, and I'm worried about it. –Myriam, Environmental Sector*

[143]Birth defects and childhood leukemias have risen between 200-400% in the Basra region since 1997.

**Discussion (Theme 2)**

The main issues revealed in this section have exposed a hightened sense of awareness of environmental contamination, a clear change in rates of cancer rates pre- and post-war and, lastly, the variable nature of official statistics. Indeed, for Sara, Mohamed and Myriam, there was a general sense of the pervasiveness of the wartime toxins and how they most likely had long-term impacts on individual health. The images of the oil fires were etched into the collective memory and indeed it serves as the quintessential symbol of the Gulf War. At a certain level, if the local population had noticed an increase in disease, then this observation becomes empirical evidence and should be officially taken into account. As several of my interlocuters mentioned, there is a general belief that the official, government statistics have been manipulated. After all, the State has a strong interest not to divulge an abnormal increase in cases which may open the door to claims for compensation (Al-Refai 2011, Petryna 2006, Kuwait Times 2009, 2010, 2011). Unlike Chernobyl and Russia, the Kuwait state has very deep coffers and a populace that is well aware of their legal rights and recourses under Kuwait law.

**Who's Clinic is it? Defining Risk when the Risks are Invisible**

How diseases are measured and recorded depends largely on the patient's contact with his or her doctor. In the clinic, doctors observe most readily the patient's symptoms while trying to hypothesize on the origin of the disease

(DiGiacomo 1999, Helman 2000). In post-conflict societies, however, this origin is often elusive and/or multifaceted (Kleinman 1988, Scheper-Hughes 1992).[144] Clearly, there is a dependence but also great skepticism of the Kuwaiti health care apparatus as described in Chapter 4. In Kuwait, many of my informants cited issues around the lack of transparency or perceived neglect on behalf of the government to effectively pursue, track and document the increase in various diseases:

*Three of my close friends have hyperthyroidism. I don't think the Ministry of Health wants to look into it, it might be suppressed. It's for political reasons. It's (should be) about prevention, there's a screening test for breast cancer, really caring for it.*

*We need to document (the diseases), it is restrictive in the hospitals here. The associations (disease-environment) are a good place to start, we need your help, it's going to be used. –Hoda, idem*

*Now a lot of the people are dying from cancer, but we didn't find out until it was too late...*
*We smell the same air, they shouldn't be denying it, they should just leave, then do more screening for breast cancer. --Dr. Iqstal, retired Kuwaiti pediatrician*

*In the end, it's all caused by politics. –Hoda, idem*

These individuals highlight a certain amount of disdain, if not contempt, for the health care system and the decisionmakers in charge of it. For example, the first informant uses the word "suppressed." The last quote, in particular, implies that the systems has been abused by external political forces. Many cancer patients wish that the Ministry of Health would take a more active role in screening, tracking and researching links to chemical exposures.

[144] I already discussed the Foucauldian notion of the *seen* and the *unseen* –key ideas in operationalizing theory on the lived experience (Foucault 1973).

*Why are we seeing the same illnesses in Gulf War Veterans in your country? -- Dr. Iqstal, retired Kuwaiti pediatrician*

One chemical in particular that has been at the brunt of claims of contamination and exposure in post-conflict Kuwait: Depleted Uranium, also known as "DU." Many individuals have commented to me about this noxious chemical and believe that it has clear and devastating effects on human health—namely cancer and birth defects:

*The thyroid problems from depleted uranium are really a high number. --Hoda*

*They've(Iraqis) thrown bombs here and there, all over Kuwait, this small land, it's enough to cover a continent.*
*Eventually they brought in companies for cleanup, burning oil and dumping oil in the sea. –Talal, Health Interest*

*The uranium (debris) is going to stay, it's not going to move, unless you do something about it. A special on Al-Jazeera noted that the (uranium) dust has been detected in Europe after the sandstorms in 2004. –Talal, idem*

However, many Western scientists have often minimzied their claims regarding depleted uranium, both in public and in private, leading Kuwaitis, as they highlight themselves above, believe that Westerners do not take this issue seriously. Morever, radiation is an invisible substance—one cannot contain, smell or feel it. So, residents often wonder how do they know it is there—can it dissipate—how? When?[145]

**Discussion (Theme 3)**

[145] The issue of DU is discussed in a separate paper on its risks (Cange 2012).

Certain risks, such as physical ones, are considered more measurable and, in a biomedical sense, more valuable than mental health risks in many post-conflict societies (Bloom 1994, Abramowitz 2005). And, as implied, the politics of these risks is also at play in defining these risks for Kuwaitis. While there was one clinic established expressly for the sole purpose of treating mental health conditions (Al-Riggae), the clinic was closed in 2001. In most clinics, the doctor is the sole official who can determine—or at least authorize-- the most efficacious course of treatment (Foucault 1973, DiGiacomo 1999). The quotes above demonstrate a certain distrust and disbelief of the State narrative vis-à-vis environmental and health issues. In particular, they are drawing links between the events of the Gulf War, notably the oil well fires, and persistent environmental and health problems in Kuwait. Next, I wish to examine more closely the role of the military and its weapons.

**Final Synthesis of Themes**

This chapter has developed three themes that informants identified in their own experiences with rising disease rates in contemporary Kuwait: Violence Embodied, A Toxic Legacy, and Defining Risks. By giving these informants an active voice in the research process, I have been able to examine how the Kuwaiti environmental health community perceives the role of the Gulf War and the environment. Many informants expressed concern that environmental contaminants may play a role in the rising counts of diseases such as breast cancer. The latter illness had only a couple hundred cases recorded per year

before 1990. Given the highly developed nature of Kuwait's health care system before the war, this documented increase (Chp 5) was not likely due to a lack of screening—as several Western health professionals have intimated to me in various briefings in the U.S. Moreover, my informants described the political climate in the Ministry of Health and noted a general lack of transparency or trustworthiness on the part of the administration to investigate the war's very likely toxic legacy.

As Nikolas Rose reminds us, NIH-funded researchers are mandated to divulge their findings in a open source publications (Rose 2007); so the U.S.government is compelled, perhaps not by U.S. code, but from at least an ethical standpoint, to notify all of its employees --including those at the frontlines-- of the potential health risks associated with the weapons that they deploy (Roberts 1988, Baron 2006).

One begins to wonder about the cumulative impact of the psychological and chemical exposures from the war. Did the psychotraumic stress of the war exacerbate the physicological stress of the war, as discussed earlier? Clearly, all Kuwaitis “were marked” by the war: the collective trauma in Kuwait was unparalleled with effects still negatively affecting Kuwaiti mental health (Al-Adwani 2011, Aware 2011). And many Kuwaitis, upwards of 90%, were exposed to some level of highly toxic petrochemicals soot and trace amounts of depleted uranium from war munitions (Dr. Amani 2011). Furthermore, environmental exposures incurred during conflict become both physically and psychologically

embodied and build slowly over time inside the individual (1992, 2005). Sara, Myriam, Wadha, Wael—many of my participants echoed this sentiments in their comments to me. As a result, these individuals may be much more susceptible to carcinogenesis, neurological damage or other physical and psychological impairments than his or her non-exposed peers (DiGiacomo 1999). For example, tortured Kuwaiti POWs, as Wadha mentioned in our interview, suffered both severe physical and mental wounds (Casey 2007).[146] Further research has suggested that disease etiology is highly influenced by the accumulation of stress from torture or witnessing acts of torture (Erikson 1978, Helman 2000). And while the effects of depleted uranium remain contested, as Talal and other participants noted earlier, the vast amount of carcinogenic petrochemicals recorded in the water, food chain and the environment-at-large means that these chemcials will continue to affect Kuwaiti health for generations to come.

[146]"I saw a large number of torture cases. I still recall that one of the torture victims was burned. Burn scars could be seen on the various parts of his body. His nails were pull out and there was a big hole in his chest. I also saw another victim who was still alive. He was suffering from a severe infection in his anus. Pus was coming out of it. The Iraqi torturers had made him to (sic) sit on a glass bottle with a broken neck." --Dr. F.A., a surgeon at a main hospital in Kuwait.

# Chapter 8

## Conclusion and Reflections

This dissertation sought to assess whether the public reports of increases of breast cancer in Kuwait since the Gulf War were indeed scientifically true. By employing a mixed-methods approach, I was able to obtain, collate, process, and synthesize data and results from multiple sources (Bazeley & Kemp 2012; Jick 1979; Sandelowski 2000; Creswell & Clark 2011). Mixed Methods were previously elaborated in Chapter 2. This dissertation relied on the "Converging" strategy of mixed methods (Jick 1979; Creswell & Clark 2011; NIH 2011). Most importantly, this project was motivated by a desire to give a voice to ill civilians who for so long have gone unnoticed in their claims for diagnosis, recognition, and compensation. The relatively few previous war-related health studies have focused almost exclusively on veterans (Dobie 2004; Levy & Sidel 1997). While this is indeed an important population to study, it is also a unique population, and the results from these studies are not particularly generalizable to a larger public.

### *Summary*

The main conclusions from the project's empirical chapters are as follows:

From Chapter 5, we learned about the "shift" in breast cancer rates that began around 1998. From the late 90s on, breast cancer has become a common occurrence in Kuwaiti households with 2 additional cases/100,000, year. We believe that over a 5 year period, this has led to an excess of 100 deaths from breast cancer in the Kuwaiti population. This chapter also shed light on the fact

that many other cancer sites are also increasing more rapidly than in neighboring countries. Cancer is also increasing in the post-war period at a much faster rate than other diseases, such as heart attack, which is increasing at around 0.25 cases/year. Leukemia and NHL distributions also appeared to be increasing at an alarming rate, and perhaps related to the chemicals released during or in the aftermath of the war. In addition, the appearance of flucuations in thyroid cancer may suggest a possible radiologic exposure in Kuwait.

Chapter 6 had interesting descriptive data, as well as results from the logistic regression models. In particular, there was an association between stress, as measured by the mental health measure, and the appearance of breast cancer in Kuwaiti women. Also, women who self-identified as trauma victims were more likely to have breast cancer than healthy women. Lastly, it seems that there was some preliminary evidence[147] that women who stayed during the war were more likely to develop cancer than those who left Kuwait or arrived after the oil well fires were extinguished.

In Chapter 7, we learned about the growing fear around cancer among a majority of the respondents. One woman stated that "it's like the flu…every family has it." Other women were more concerned with how the government has not appropriately responded to concerns of the public, or perhaps even obfuscated the true incidence of cancer in Kuwait. Many of the participants felt that their voices had not been heard. In fact, they had taken to educating

[147] Here I am referring to the two univariate analyses' findings that suggested that there is an association between oil well fire time residence and breast cancer occurrence.

themselves on the possible causes of the diseases, and in some cases, even conducting their own research.

*Synthesis*

Among these chapters, there are several overlapping findings. One, the cancer rate is increasing for certain cancers more than perhaps if the war had not occurred. In particular, the aforementioned statistically significant shift in breast annual cancer rates (Chapter 5) coincides with the perceptions reported in Chapter 7 of those interviewed in the environmental health community that cancer rates have suddenly increased without a proper or obvious explanation in the same time period as Chapter 5. Also, women present during the Gulf War oil well fires, and therefore exposed to more chemicals during the Gulf War aftermath, had higher odds of seeking breast cancer screening, . Moreover, Chapter 6 found that the higher odds of women having experienced a stressful life event, such as a loss of a partner, divorce, or a family member as a prisoner of war led to higher odds of a woman developing breast cancer; 38% of the women in the sample were screened for PTSD based on a self-reported traumatic event, with the highest percentage in the breast cancer group (Chapter 6).

The stress component reported in Chapters 6 and 7 means that many individuals are still suffering from PTSD-related issues that may be indirectly related to the war with reported PTSD incidence at 20% in the Kuwaiti population. It would seem that the exposures of the war, often dichotimzed into

either chemical or psychological, actually are working in concert to influence Kuwaiti health outcomes. This synergistic exposure means that individuals may be more susceptible to carcinogenic growth as the immune system does not operate at full capacity when the body is constantly dealing with stress reactions (Chapter 3). Furthermore, the reported increase in cancer rates may induce additional stress in the population, also playing a role in carcinogenesis.

Chapter 5's cancer rate data complement the stress data in Chapter 6 because they help to show that there was an increase in cancer rates that may be linked to the Gulf War, and that these increases are related to war-related exposures to the wartime oil fires or depleted uranium. In particular, the exponential growth of some of the rates (e.g. thyroid, leukemia) strongly suggest that the exposures were syngergistic. In other words, several factors may have been promoting faster cancer growth such that one or the other alone would not have been able to induce in the same manner.

Furthermore, as presented and discussed in Chapter 7, the government's lack of response and, in some cases, obfuscation of the release of cancer rates and of the reasons behind their increases, has also generated a substantial amount of concern and stress for the populace, according to many of the respondents who were interviewed. Similar results were seen in the Chernobyl aftermath in the Ukraine after Chernobyl (Petryna 1999). One of the key *Owzla* subscales was a lack of trust in the government; trust between individuals has been severely eroded over the past 20 years (Casey 2007), and that the average Kuwaiti does not trust his/her government to successfully provide for his or her

needs (Treteault 2011). Indeed, in the qualitative interviews there were increased calls to thwart corruption and nepotism in the government-related business deals.

This project limitations, as scrupuously outlined in Chapters 5, 6, and 7, led to some universal limitations for the overall project, including a limited sample size and limited data access to cancer rates data for all study countries—typical issues in mixed-methods studies (Creswell & Clark 2011). Also, it was not a randomly controlled study—in particular, we used purposeful snowball sampling for the qualitative research reported in Chapter 7 which has limitations because we may have oversampled those individuals who believe in a war-disease connection or who have a particular vendetta against the government due to a perceived lack of poor care or service in the government hospitals (Creswell & Clark 2011).

*Main Recommendations for Future Post-Conflict Research*

The empirical research conducted in this population helped to verify usefulness of the conceptual models presented in Chapters 2 and 3. The first model demonstrated the various layers by which individuals are exposed to insults and the related health consequences over time. The latency period appeared to be a critical element in understanding carcinogenesis after war-time exposure. The second model has been influential in laying the framework for determining the two pathways of war-time exposure: chemical and psychosocial.

1. *More Civilian-Focused Post-Conflict Health Research*

This project exposed the importance of examining civilian health in post-conflict regions. Traditionally, most post-conflict research has been conducted on veterans and their families. The civilian populations are, however, larger and exposed more often on a chronic basis to chemicals and stressors than their veteran counterparts. Although most modern wars use weapons that may have chemical residues, the Gulf War is unique in modern history for the amount of environmental toxins that were released in the conflict (Bloom 1994, Time 2010). Furthermore, I would add that the civilians' health complaints should be listened to and documented as evidence in post-conflict analyses. More often than not, the only voices taken into consideration in post-conflict health analyses are the experts while the civilians' concerns are considered "anecdotal" and marginalized as a footnote to a larger scientific narrative (Bloom 1994, Petryna 1999, Levy & Sidel 1997). Scientists regularly suggest that civilians have been subjected to only limited exposure of chemicals (Bloom 1994; Levy & Sidel 1997).

Civilians, who are exposed to wartime chemicals and trauma, are

virtually held captive in their own communities, and, in most cases, cannot easily leave (Levy & Sidel 1997, Masten 2012).[148] Indeed, they are subjected to harmful exposures during the entire length of combat. After combat has ended, chronic exposures continue to impact their health (Levy & Sidel 1997; Stocking 2010).

2. *Post-conflict research necessitates creative and unique solutions.*

This point is critical because the exposures are often difficult to measure *post hoc* and/or are at relatively low chronic doses (Saleh 2008, Bloom 1994, Abramovitz 2005). Most importantly, this mixed-methods project has underscored the syngeristic nature of chemical and psychosocial factors in examining post-conflict populations. Indeed, few researchers have explicitly strived to frame their research questions around the dual effect of chemical/radiological effects on human health in conjunction with psychosocial factors (Davis 2005).

In this project, we have focused mostly on the psychosocial factors; these factors have often been examined individually. This study attempted to combine measuring psychotrauma, alienation, and mental health issues in a post-war context using mixed methods. A culturally-relevant approach was followed to measure alienation in Kuwaiti society. While it was not always possible to directly link the psychosocial factors to the war itself, given the testimony of civilians

[148] In some conflicts, nationals are forced to flee the country thereby becoming refugees in neighboring nations.

and experts alike, we know that the long-term effects of the war likely have heavily influenced these factors in Kuwait.

3. *Mixed-methods means including qualitative methods.*

This point sounds simple. However, despite the multitude of literature written on mixed-methods in public health and in medical anthropology, few public health studies are able to reach a balance between the quantitative and qualitative methods in the results (Bazeley & Kemp 2012; Jick 1979, NIH 2011; Sandelowski 2000; Creswell & Clark 2011). Qualitative methods tend to be "quantified" such that they loose their intrinsic values, such as empowering the participant, as is emphasized in Community-Based Participatory Research, or interview results tend to be oversimplified and/or overcoded so that the larger themes may not receive proper attention or be shadowed by more quantitative-focused results. Quantitative results are indeed enriched and deepened with well-integrated qualitative data in any mixed methods study (Bazeley & Kemp 2012; Jick 1979).

4. *The politics of post-conflict health issues should be included in any post-conflict health analysis.*

In this study in Kuwait, I quickly learned that many of my participants were aware of the deep coffers of the Kuwaiti State.

Likewise, they were aware that their environment and their health were not main priorities of the Kuwaiti government. Several participants, as expresed in Chapter 7, felt that the government was continually obfuscating conflict-related health information, and was not properly reporting the extent and egregious effect of the health consequences of the war. Thus, many Kuwaitis believe that they are entitled to a certain compensation for the loss of productivity and/or health in the post-conflict era.

Other cases in the literature underscore the reckless behavior of governments in the development of weapons and the subsequent denial of responsibility. One case of an entire neighborhood developing childhood cancers in Shirley, Long Island, was located just a couple miles from a U.S. Department of Energy Brookhaven laboratory (McMasters 2008). Later, environmental sampling found the lab's Tritium isotopes within the affected families' water supply was linked to this cancer cluster (McMasters). To date, there has been no compensation offered to the residents of Shirley, nor has there been any compensation offered to the Kuwaitis suffering from illness.

On balance, this project retrieved, explored and reported on a vast quantity of data and records related to the incidence of breast cancer. More precisely, it showed how Kuwaiti women are affected by cancer and how they

cope with the various post-conflict stressors that may lead to carcinogenesis. However, it remains to be seen how the national government will respond to this growing epidemic. Will they acknowledge the role of the US military? Will they offer compensation to affected women? Will they offer additional social programs, such as support groups to them? Will they finally conduct a proper clean-up of the Kuwaiti desert? Although I remain pessimistic about the government's willingness and interest to resolve this issue, sometimes public pressure has its way of exerting political change. In Kuwait, as in the rest of the Arab World, the public is increasingly exasperated with the current governance, and this may lead the government to respond to increasing calls for justice for Gulf War cancer victims. From a public health perspective, the most pressing concern is to alleviate petrochemical exposures and execute a total clean-up of the Kuwaiti environment.

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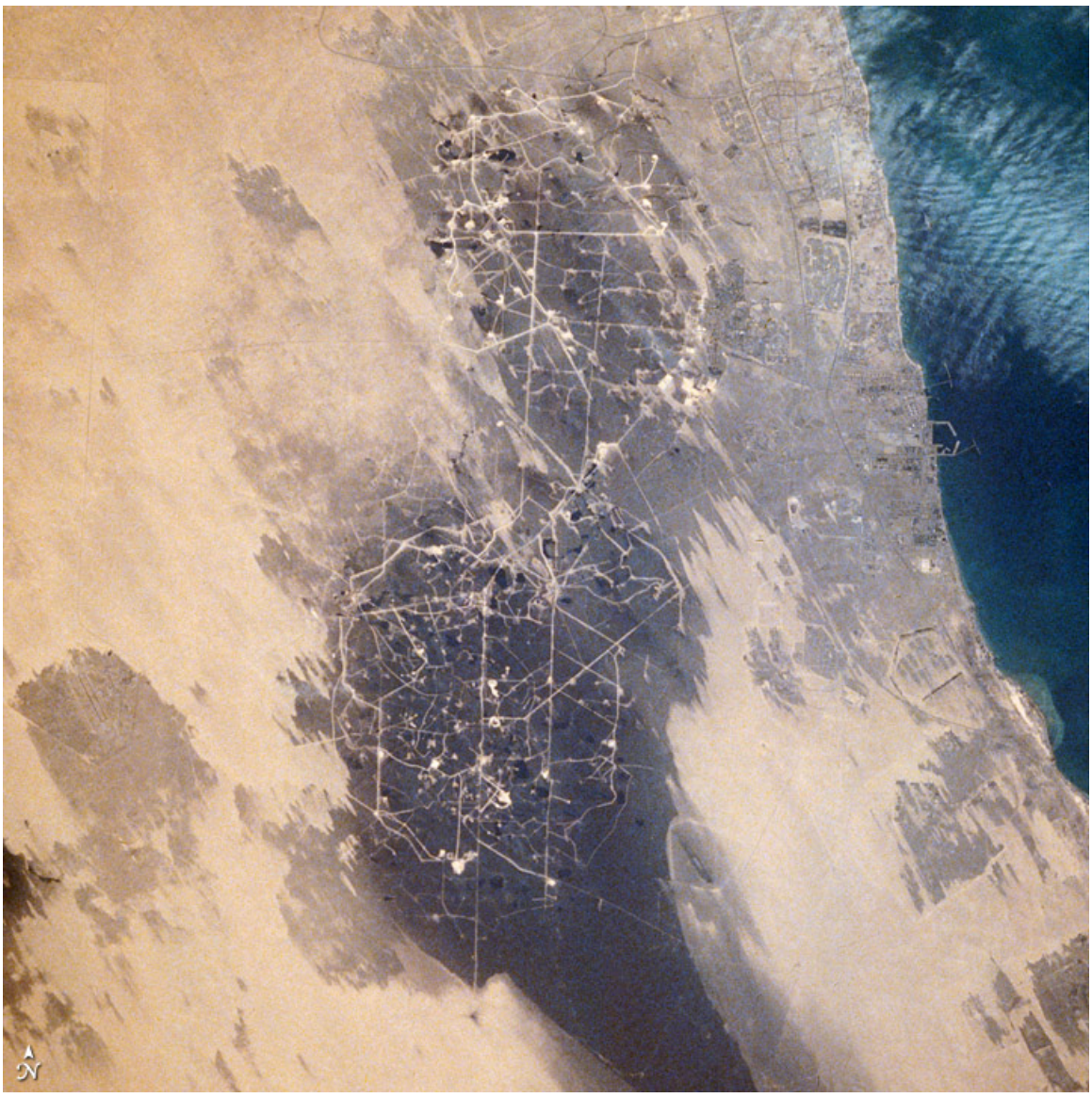
## APPENDIX A


Map of the State of Kuwait and its major cities. Courtesy U.S. State Department.

## APPENDIX B

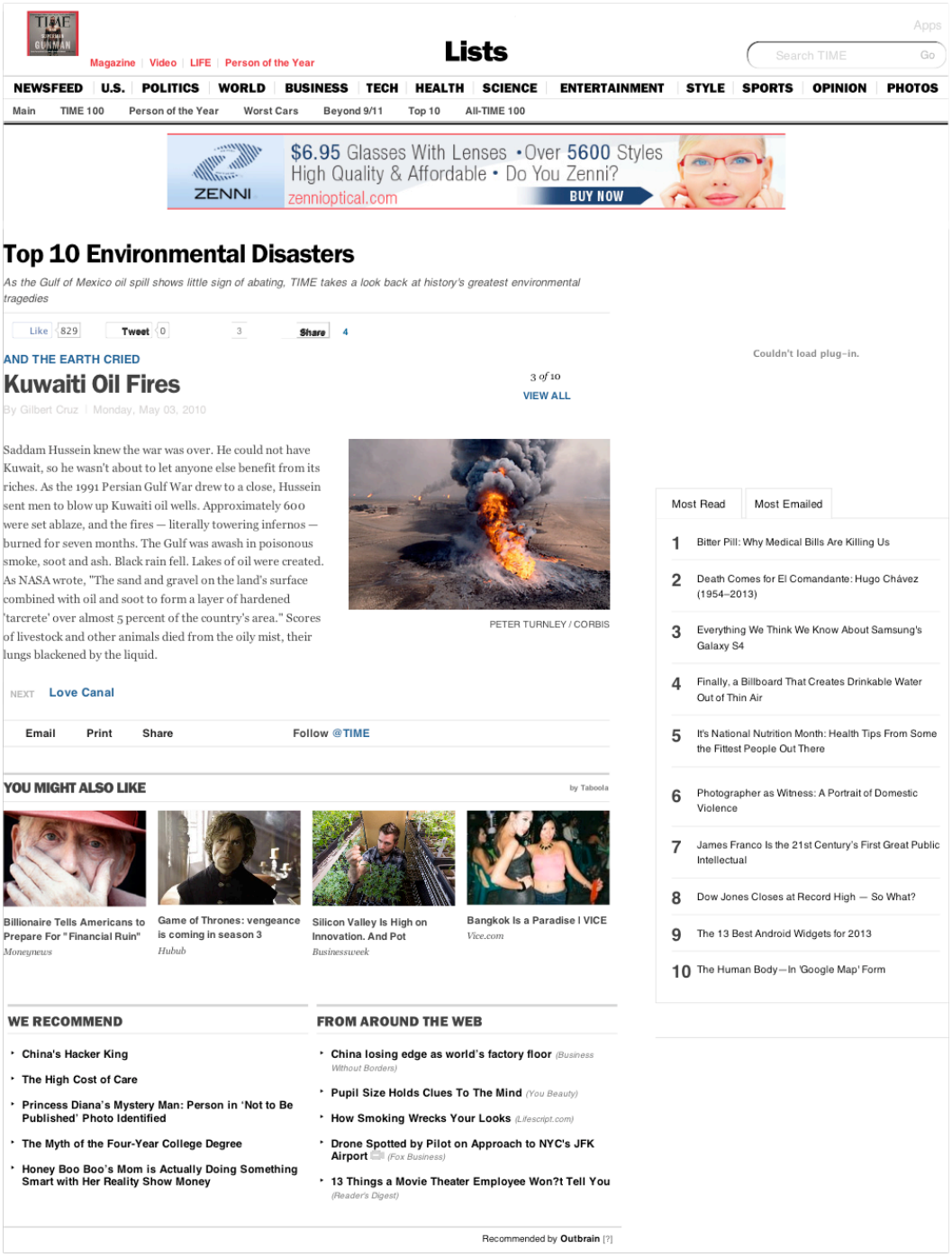
Oil Fire Plumes Covering Kuwait, June 1991 as seen from space. Courtesy NASA.

## APPENDIX C



Residual Soot and Tarcrete from the Oil Fires, November 1991. Courtesy NASA.

# APPENDIX D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AND THE EARTH CRIED
Kuwaiti Oil Fires
3 of 10
VIEW ALL
By Gilbert Cruz | Monday, May 03, 2010
Saddam Hussein knew the war was over. He could not have Kuwait, so he wasn't about to let anyone else benefit from its riches. As the 1991 Persian Gulf War drew to a close, Hussein sent men to blow up Kuwaiti oil wells. Approximately 600 were set ablaze, and the fires — literally towering infernos — burned for seven months. The Gulf was awash in poisonous smoke, soot and ash. Black rain fell. Lakes of oil were created. As NASA wrote, "The sand and gravel on the land's surface combined with oil and soot to form a layer of hardened 'tarcrete' over almost 5 percent of the country's area." Scores of livestock and other animals died from the oily mist, their lungs blackened by the liquid.
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5 It's National Nutrition Month: Health Tips From Some the Fittest People Out There
6 Photographer as Witness: A Portrait of Domestic Violence
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13 Things a Movie Theater Employee Won?t Tell You (Reader's Digest)
Recommended by Outbrain [?]

**APPENDIX E**

# Cancer reached serious prevalence rate in Kuwait -- Al-Sayer.

KUWAIT, Nov 9 (2009) (KUNA) -- Minister of Health Dr. Hilal Al-Sayer said Monday the statistics of the World Health Organization (WHO) showed that cancer reached serious prevalence rate in the country. "The disease is a major cause of death in the State of Kuwait," Al-Sayer said citing surveys of the WHO Statistical Information System (WHOSIS). The minister made the remarks while inaugurating Kuwait's First National Conference on Cancer Control. He highlighted the importance of disseminating knowledge about ways for prevention and early detection of the fatal disease, noting that 30 percent of cancer deaths can be prevented. "The two-day conference provides a timely opportunity for local and foreign specialists to examine local and global statistics and develop recommendations for policy-makers to control the disease," Al-Sayer pointed out. The minister praised the efforts being made by the Kuwaiti commission for cancer control.

Meanwhile, Medhat Oteifa, chairman of the Surgery Division of Hussain Mikki AL Juma'a Center for Specialized Surgery, said cancer constitutes a global burden. "Cancer accounts for 7.4 million deaths including 1.2 million women worldwide," he said, citing the WHOSIS figures. "The number of female deaths is likely to top 2 million in 2020, Oteifa predicted. Kuwaiti Ministry of Health reports 1,300 new cancer cases annually 50 percent of the patients recover while the remaining percentage succumb to the disease.

# APPENDIX F

UNIVERSITY of WASHINGTON
HUMAN SUBJECTS DIVISION

Date: December 13, 2010

PI: Mr. Charles Cange
The Graduate School/Individual PhD Program

Re: Human Subjects Application #39632 "Assessing Post-Conflict Social Alienation *Ighterab* in Kuwaiti Cancer Patients"

This project was submitted for IRB review on October 13, 2010 under application #39498 "A Post-Conflict Health Assessment of Kuwaiti Diabetic Patients" and replaced by application #39632 on November 8, 2010. During the course of staff review of application #39632, additional information was provided by the principal investigator such that the project was determined to be eligible for Certificate of Exemption.

I have reviewed the project under Certificate of Exemption category number (2) Survey/Interview/Observation Research.

This determination is valid for the period beginning **December 13, 2010,** and ending on **December 12, 2015.**

The following restrictions apply:

1. This determination is made with the understanding that no children will be enrolled as subjects (children being defined as those individuals who have not attained the age of majority in the location in which the research will be conducted), no prospective collection of biological specimens will occur, and study data will be collected anonymously, that is, after each interview is complete there will be no method by which study data could be linked back to individual subjects.

2. To ensure that the project maintains exemption status, no substantive changes may be made to the study instruments. Should the PI find the need to make substantive revisions, a new Certificate of Exemption or application must be submitted for review and approval prior to enacting those revisions.

3. The determination for this activity cannot be renewed. Should the activity need to continue past the period listed above, a new Certificate of Exemption or application must be submitted for review and approval.

4. Because this study has been determined to be exempt from the regulations found at 45 CFR 46, no further review by another IRB is necessary to meet Department of Education requirements. However, this exemption determination does not supersede any applicable regulations or policies of the locations in which you will conduct the research, for example Kuwaiti law or policies of the hospital(s) in which you will conduct the research. Please be advised that you should secure the necessary approvals prior to initiating your research.

Adrienne Meyer, CIP
Human Subjects Review Administrator
(206) 543-0471
gevjon@uw.edu

4333 Brooklyn Ave. NE, Box 359470 Seattle, WA 98195-9470
main 206.543.0098 fax 206.543.9218 hsdinfo@u.washington.edu www.washington.edu/research/hsd

# APPENDIX G

UNIVERSITY of WASHINGTON
HUMAN SUBJECTS DIVISION

Date: 10/25/11

PI: Mr. Charles Cange
Graduate Student
Interdisciplinary Studies

CC: David Grembowski

RE: HSD study #41651 "Assessing health in post-conflict Kuwait: The role of key community members"

Dear Mr. Cange:

The University of Washington Human Subjects Division (HSD) has determined that your research qualifies for exempt status in accordance with the federal regulations under 45 CFR 46.101/ 21 CFR 56.104. Details of this determination are as follows:

Exempt category determination: 2

Determination period: **10/25/2011 - 10/24/2016**.

Although research that qualifies for exempt status is not governed by federal requirements for research involving human subjects, investigators still have a responsibility to protect the rights and welfare of their subjects, and are expected to conduct their research in accordance with the ethical principles of *Justice, Beneficence* and *Respect for Persons, as* described in the Belmont Report, as well as with state and local institutional policy.

**Determination Period:** An exempt determination is valid for five years from the date of the determination, as long as the nature of the research activity remains the same. If there is any substantive change to the activity that has determined to be exempt, one that alters the overall design, procedures, or risk/benefit ratio to subjects, the exempt determination will no longer be valid. Exempt determinations expire automatically at the end of the five-year period. If you complete your project before the end of the determination period, it is not necessary to make a formal request that your study be closed. Should you need to continue your research activity beyond the five-year determination period, you will need to submit a new *Exempt Status Request* form for review and determination *prior to implementation*.

**Revisions:** Only modifications that are deemed "minor" are allowable, in other words, modifications that do not change the nature of the research and therefore do not affect the validity of the exempt determination. **Please refer to the Guidance document for more information about what are considered minor changes.** If changes that are considered to be "substantive" occur to the research, that is, changes that alter the nature of the research and therefore affect the validity of the exempt determination, a new *Exempt Status Request* must be submitted to HSD for review and determination *prior to implementation*.

**Problems:** If issues should arise during the conduct of the research, such as unanticipated problems, adverse events or any problem that may increase the risk to the human subjects and change the category of review, notify HSD promptly. Any complaints from subjects pertaining to the risk and benefits of the research must be reported to HSD.

Please use the HSD study number listed above on any forms submitted which relate to this research, or on any correspondence with the HSD office.

Good luck in your research. If we can be of further assistance, please contact us at (206) 543-0098 or via email at hsdinfo@uw.edu. Thank you for your cooperation.

Sincerely,

Katy Sharrock
Human Subjects Review Coordinator
(206) 616-5576
sharrock@u.washington.edu

4333 Brooklyn Ave. NE, Box 359470 Seattle, WA 98195-9470

main 206.543.0098 fax 206.543.9218 hsdinfo@uw.edu www.washington.edu/research/hsd

## APPENDIX H

Assessing Health in post-conflict Kuwait: the Role of Key Community Members

# Interview Consent Form

**INVESTIGATOR:**

University of Washington
Charles Cange, M.Phil, PhC (66-192-182)

I am asking you to be in a research study. The purpose of this form is to give you the information you will need to help you decide whether to be in the study or not. Please read the form carefully. You may ask questions about the purpose of the research, what I would ask you to do, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When I have answered all your questions, you can decide if you want to be in the study or not. This process is called "informed consent." I will give you a copy of this form for your records.

**PURPOSE OF THE STUDY**: This study would like to better understand the impact of on-going environmental degradation from the war on diseases in Kuwait today. Moreover, it queries: How do Kuwaitis describe these diseases or syndromes? Why do some people believe the syndrome exists today?

**PURPOSE OF THIS INTERVIEW:** As a valued community member, you were chosen for this study based on a referral from another colleague. This project examines key informants views on the prevalence of chronic diseases in Kuwait by carrying out interviews asking questions about the effect of the Kuwaiti environment on health. The aim of this project is to describe the professional's views and examine how these views inform the health discourse in post-conflict Kuwait.

**PROCEDURES FOR THE INTERVIEW:** About 30 Kuwaiti community members, roughly balanced between NGOs, academia and government, will be invited to participate in the face-to-face interviews. The interviews will last about 60 minutes and will be conducted by Charles Cange. The interviews will be conducted in a mutually agreed-upon location. Before

the interview you will receive the list of questions and background information about the project. The questions ask about the effects of the environment on health in Kuwait and how war has affected the environment. The interviewer will audio-record the comments during the interview. After the interview is over, Investigator Cange may seek to clarify the information collected in your interview, or he may discover a new question(s) to ask you. In this event, he will send you an email message requesting clarification, or asking you to answer the new question(s).

**BENEFITS:** You may not benefit from participating in the interviews. You may, however, potentially benefit from the interviews through a feeling of helping to contribute to the health of Kuwaiti society through participation in the interviews.

**POTENTIAL RISKS OR DISCOMFORT:** A potential risk for participating in the interview is loss of confidentiality. The interview data will be anonymous, unless you choose for your name to be associated with your interview. Anonymous means that the individual's name does not appear with the text of the interview, and another fictional name is used in its stead.

**PARTICIPATION IS VOLUNTARY:** Your participation is voluntary. You are free to withdraw from the interview at any time, and you may refuse to answer any questions that you do not want to answer. If you choose not to be interviewed, there will be no penalty or loss of benefits to which you are otherwise entitled.

**CONFIDENTIALITY:** Information about you will be kept confidential. Identifying information such as your name and title will be stored separately from your answers to the questions unless you choose for the investigator to use your name openly. Information collected from the community members, will be used to document the history of health in Kuwait. Facts and other information about this issue will be combined to create an historical narrative.

**WHO TO ASK IF YOU HAVE QUESTIONS:** If you have any questions or concerns about the study, please call Charles Cange (66-192-182). If you have questions about your rights as a research subject, you can contact the University of Washington Human Subjects Division (1-206-543-0098, hsdinfo@uw.edu).

**RESEARCHER:**

My signature below indicates that I have fully explained the study procedures and the risks and benefits of your participation. I will answer any questions that you may have at any time.

_____

_____

*Signature of Researcher* *Date*

**PARTICIPANT'S CONSENT:**

My signature below indicates that I have voluntarily decided to participate in this interview after reading the information above. I have had a chance to ask questions, and they have been answered to my satisfaction. I understand that I can ask questions at any time, and that a copy of this consent form will be given to me for my records. If I want my name to appear in relation to the answers provided in this interview, I will so choose by checking the space below.

_____ My name may be reported___

Participant (Please PRINT Name)

_____

Signature of Participant Date

## APPENDIX I

# Intake

| Visit Date and Birth Date, Location | | | |
|---|---|---|---|
| Visit Date ___/___/_2011___ (day) (month) (year) | | Date of Birth ___/___/____ (day) (month) (year) | Kuwait Location (area) _____ |
| **Basic Information** | | | |
| Screen reason/control/Diagnosis Date | Sex | Height (cm) | Weight (kg) |
| ___/___/_20___ | Male Female | _____ | _____ |
| **Demographic Information** | | | |
| Marital Status (s, m, d, w) | Education (years and/or degree) | Employment (type or n/e) | Income (KD/mo) |
| | | | |

| Inclusion Criteria | |
|---|---|
| | No Yes |
| The participant is informed about consent form prior to study<br>The male or female participant is Kuwaiti or live in Kuwait most of his/her life and is an Arab nation (e.g. Bedoon, Saudi, etc.)<br>The patient is being screened or has clinically diagnosed breast cancer, or is control. | |
| | |

| Now | Not at all Much | Some | Very |
|---|---|---|---|
| **Physical Health**<br><br>1. Do you have any trouble taking a walk?<br>2. Do you need to stay in bed or a chair during the day?<br>3. Were you limited in doing either your work or other daily activities?<br>4. Were you short of breath?<br>5. Have you had pain?<br>a.Joint: hips and extremities<br>b.Joint: neck and shoulders<br>6. Did you need rest of felt tired?<br>8. Do you smoke (cigarettes, shisha, etc?)<br>9. Have you lacked appetite?<br>10. Have you felt nauseated or vomited?<br>11. Have you had diarrhea or constipation?<br>12. At night do you have a fever or sweats?<br>13. Have you had balance/coordination issues? | 1 | | 5 |
| **Mental Health & Traumatic Events**<br><br>**1.** The next question is about whether or not you have you experienced one or more traumatic events in your life. The types of events that might be considered traumatic are: a major accident, physical or sexual assault or abuse, witnessed violence (interpersonal or war), or witnessed a major natural disaster. Please answer only 'yes' or 'no' and, if yes, indicate if the overall exposure to the trauma or traumas has had a mild, moderate or significant impact on your life.<br><br>A. Have you experienced one or more traumatic event in your life? __yes __no<br><br>B. (For those who respond positively): Has the trauma had a mild, moderate, or significant impact on your life? __mild __ moderate __significant<br><br>2. Have you been having persistent difficulty concentrating?<br>3. Do you feel nervous in large groups of people (e.g. shopping mall, school, wedding)?<br>4. Have you markedly lost interest in free time activities that used to be important to you?<br>5. Have you been having a lot of difficulty falling or staying asleep?<br><br>6. Have you felt that your ability to experience | | | Freq. |

| | |
|---|---|
| emotions is less (unable to have loving feelings,feel numb, or can't cry when sad)?<br>7. Have you felt detached or cut off from others around you (since the event)?<br>8. Have you felt that any future plans or hopes have changed (because of the event(s) (for example: no career, marriage, children, or long life)?<br>9. Have you had trouble making decisions?<br>9a. Did you feel tense or worried?<br>10. Have you been continuously irritable or having outbursts of anger?<br>11. Do you feel sad all the time?<br>12. Have you had memory problems?<br><br>13. Has your physical condition or treatment interfered with your social activities?<br><br>14. Are you overtly alert (checking to see who is around you) (since the event)?<br><br>15. Have you been jumpier, more easily startled, (since the event)?<br><br>*If the patient said "yes" to number 1A, then proceed with these questions; otherwise skip to Alienation:*<br><br>16. Have you been having intense PHYSICAL reactions (for example: sweating, heart beating fast) when reminded of the event(s)?<br>17. Have you had repeated or intrusive upsetting thoughts or recollections of the event(s)?<br>18. Have you been having repeated bad dreams or nightmares about the event(s)?<br>19. Have you had the experience of suddenly reliving the event(s), flashbacks of it or acting or feeling as if the event were happening again?<br>20. Have you been intensely emotionally upset when reminded of the event(s), including anniversaries of when it happened?<br>21. Do you often make efforts to avoid thoughts or feelings associated with the event(s)?<br>22. Do you often make efforts to avoid activities, situations, or places that remind you of the event(s)?<br>23. Do you find that you cannot recall important aspects about the event(s)?<br><br>**Alienation (answer True, False or Maybe)**<br>1. These days a person doesn't really know whom he can count on.<br>2. Human nature is fundamentally cooperative.<br>3. Most people can be trusted.<br>4. I can normally do what I want to do in today's set-up.<br>5. The decisions of our courts of justice are as fair to a | 1_____5 |

poor man as to a wealthy man.
6. Considering everything that is going on these days, things look bright for the younger generation.
7. Youth delinquency is not as serious as problem as the papers play it up to be.
8. For the most part, the government serves the interest of a few organized groups, such as business or labor, and isn't very concerned about the needs of people like myself.
9. In spite of what some people say, the lot of the average man is getting worse.
10. It is difficult for people like myself to have much influence in public affairs.
11. Life today is a difficult and dangerous business and it's a matter of chance who gets on top.
12. No one is going to care much what happens to you.
13. Most members of parliament and city councilors are sympathetic people and do a good job.
14. Our community is an easy and pleasant place to live in.
15. We seem to live in a pretty rational and well-ordered world.
16. There is little or nothing I can do towards preventing a major "shooting" war.
17. We are just so many cogs in the machinery of life.
18. The end often justifies the means.
19. I often wonder what the meaning of life really is.
20. Sometimes I feel all alone in the world
21. One can always find friends if he shows himself friendly.

**Miscellaneous Questions**

1. Have you had symptoms after smelling some substance or item?
2. What item?

2. Have you ever had impotence or pain during or after sex?
3. Are you practicing any exercise?
Type?
How much/week?
4. Have you had swollen glands?
Under neck?
Under arms?
Gonad area?
5. Have you had tingling or numbness?
Where?

**Diet**

**1.** How many times do you eat at home per week (%)?

2 How many times do you eat in restaurant per week (%)?
3. How many times do you eat in fresh food per week (%)?
4. How many times do you eat in frozen food per

week (%)?
5. How many times you eat animal fat per week (%)?
6. How many times you eat with oil per week (%)?

7. Where does your food come from (co-op, Carrefour)?
8. How much Kuwait bread (time/day)?
9. How much Kuwait meat per week?
How much Kuwait chicken per week?
10. How much water per day (glasses/day)?
. Which type of water do you drink (tap or bottle brand name)?
11. How much Kuwait dairy(e.g. milk, leben, yogurt, cheese, ice cream, other) (per day)?
12. How much fish and what type (per week)?

**Lifestyle/Health**

1.Do you go swimming in the Gulf?
How often?
3. Where do you think cancer comes from in Kuwait?
4. Do you have a family history of cancer?
5. Many former veterans of the Gulf War and Iraq War have a disabilitating Syndrome. Are you familiar with Gulf War Syndrome in the United States, UK or France?
6. Do you think (your) cancer is related to the Gulf War (only for diagnosed patients)?
7. Were you here during the Gulf War, how long? (Key dates: Aug 90, Jan 91, Mar 91, Nov 91)
8. Do you have allergies, which type?
9. Do you have any other illnesses or serious health conditions?
10. Does your family or friends have any cases of cancer, diabetes, neurological (e.g. MS) or other serious illnesses?
11. Does anyone you know have asthma?

## APPENDIX J

**الصحة الجسمانية**:

1. هل لديك مشكلة في ممارسة المشي؟
2. هل تحتاج للجلوس على الكرسي أو في السرير أثناء اليوم؟
3. هل نشاطك محدود في القيام بعملك أو القيام بالأعمال اليومية الأخرى ؟
4. هل شعرت بضيق في التنفس؟
5. هل شعرت بألم في:
   a. مفاصل الأرداف والأطراف؟
   b. مفاصل الرقبة والأكتاف؟
6. هل احتجت للراحة عند الشعور بتعب ما؟
7. هل تدخن (السجائر، الشيشة، إلخ...)؟
8. هل عانيت من فقدان في الشهيه؟
9. هل شعرت بغثيان أو تقيأت؟
10. هل كان لديك إسهال أو إمساك؟
11. هل تشعر بارتفاع في درجه الحرارة أو التعرق بالليل ؟
12. هل عانيت من مشاكل في التوازن الجسماني ؟

**الصحة العقليه والأحداث المأساوية:**

1. السؤال التالي عن ما إذا كنت مررت بحدث مأساوي أو أكثر في حياتك مثل التعرض لحادث جسيم، اعتداء جسدي أو جنسي، عنف شخصي أو في حرب، مشاهدة كارثة طبيعية. يرجى الإجابة بنعم أو لا. إذا كانت الإجابة نعم اذكر مدى تأثير هذه المأساة أو المآسي علي حياتك (بسيط أو متوسط أو شديد).

1 هل تعرضت لحدث مأساوي أو أكثر في حياتك ؟ (  ) نعم (  ) لا
2 إذا كانت الإجابة نعم، صف مدى تأثير هذا الحدث عليك: بسيط متوسط شديد

2. هل لديك صعوبة دائمة في التركيز؟
3. هل تشعر بالتوتر أثناء تواجدك وسط مجموعة كبيرة من الناس (في مجمعات التسوق، المدارس، الأفراح)؟
4. هل فقدت الاهتمام بطريقة ملحوظة بأنشطه وقت الفراغ التي كانت ذو أهمية لك؟
5. هل تجد صعوبة في الذهاب إلى النوم أو الاستمرار فيه؟

6. هل تشعر بأن قدرتك على إظهار مشاعرك قلت؟ أمثلة: عدم القدرة على إظهار الحب, فقدان الحس، عدم القدرة على البكاء عند الحزن.
7. هل شعرت بالانقطاع أو الانعزال عمن حولك (منذ هذا الحدث)؟
8. هل شعرت بأن خططك المستقبلية أو آمالك (مثل المتعلقة بالحياة المهنية، الزواج، الإنجاب، طول العمر) قد تغيرت بسبب هذا الحدث؟
9. هل وجدت صعوبة في اتخاذ القرارات؟
   a. هل شعرت بالتوتر أوالقلق؟
10. هل شعرت بأنك حاد الطبع أو سريع الغضب دائما؟
11. هل تشعر بالحزن طوال الوقت؟
12. هل عانيت من مشاكل بالذاكرة؟
13. هل هناك تعارض بين مشكلتك الصحية أو علاجك الدوائي ونشاطاتك الاجتماعية؟
14. هل أنت شديد الحذر دائما (تتلفت لترى من حولك) منذ الحدث؟
15. هل أصبحت سريع مندهش منذ الحدث؟ .15

**ملاحظة: إذا كانت إجابة المريض (نعم) على سؤال رقم (أ) أكمل معه باقي هذه الأسئلة.**
**إذا كانت الإجابة (لا) انتقل إلى "الاغتراب".**

16. هل تصاب بردود فعل جسمانية شديدة مثل العرق أو سرعة في ضربات القلب عند تذكرك للحدث؟
17. هل تراودك أفكار مزعجة أو ذكريات عن هذا الحدث؟
18. هل تعاني من أحلام مزعجة متكررة أو كوابيس عن الحدث؟
19. هل حدث وأن جائتك صورة مفاجأة أوأفعال أو مشاعر متعلقة بالحدث وكأنك تمر به مرة أخرى؟
20. هل تشعر بضيق شديد عند تذكرك للحدث خاصة في الذكرى السنوية له؟
21. هل تبذل مجهود عادة لتجنب الأفكار أو المشاعر المتعلقة بهذا الحدث؟
22. هل تحاول جاهدا تجنب الأنشطة أو المواقف أو الأماكن التي تذكرك بالحدث؟
23. هل تجد أنك لا تستطيع تذكر الجوانب المهمة للحدث؟

**الاغتراب (أجب بصح / خطأ / ربما)**

1. هذه الأيام يصعب علي المرء معرفة من يمكن الاعتماد عليه.
2. الطبيعة البشرية أساسها التعاون.

3. معظم الناس جديرون بالثقة.
4. باعتبار كل مايحدث هذه الأيام ' أمور تبدو مشرقه للجيل الصاعد.
5. عاده ما يمكنني عمل ما أريد إنجازه في مجتمعنا.
6. باعتبار كل مايحدث هذه الأيام ' أمور تبدو مشرقه للجيل الصاعد.
7. الخروج عن السلوكيات المقبولة اجتماعيا ليس بمشكله خطيرة كما تظهره الصحف.
8. في معظم الأحيان تخدم الحكومة مصالح بعض المجموعات المنظمة مثل التجارة, العمالة ولا تهتم بشؤون أمثالي من الناس.
9. بالرغم مما يقوله بعض الناس,الشخص العادي في حاله تدهور.
10. من الصعب على أمثالي من الناس التأثير على الشؤون العامة.
11. الحياة اليوم بمثابة التجارة الصعبة والخطيرة والصعود إلي القمة مسألة حظ.
12. لن يكترث احد بما يحدث لي.
13. معظم أعضاء البرلمان ومجلس المدينة متعاطفون ويقومون بعمل جيد.
14. مجتمعنا مكان سهل وممتع للمعيشة.
15. نحن نعيش في عالم منظم وعقلاني.
16. فقط يمكنني عمل القليل وربما لا استطيع عمل شئ للحيلولة دون وقوع حرب فعلية.
17. ما نحن إلا تروس في ماكينة الحياة.
18. الغاية عاده تبرر الوسيلة.
19. غالبا ما أتساءل عن ماهية الحياة.
20. أحيانا اشعر إنني وحيد في العالم.
21. من السهل علي المرء تكوين صداقات إذا كان ودودا.

**أسئلة متنوعة:**

1. هل ظهرت عليك أي أعراض بعد استنشاق مادة أو شيئ ما؟
    a. ما اسم المادة؟
2. هل سبق وعانيت من ضعف جنسي أو ألم أثناء أو بعد الجماع؟
3. هل تمارس أي رياضه؟
    a. ما نوعها؟
    b. كم مرة بالأسبوع؟
4. هل لديك أي غدد متورمة؟
    a. تحت الرقبة؟
    b. تحت الذراعين؟

c. بالمنطقه التناسلية؟
5. هل لديك وخز أو تنميل؟
a. أين؟

**الغذاء:**

1. كم مرة بالأسبوع تتناول طعامك بالمنزل (%)؟
2. كم مرة بالأسبوع تأكل في المطاعم (%)؟
3. كم مرة بالأسبوع تتناول الأطعمة الطازجة (%)؟
4. كم مرة بالأسبوع تتناول الأطعمة المجمدة ( %)؟
5. كم مرة بالأسبوع تتناول الدهون الحيوانية (%)؟
6. كم مرة بالأسبوع تأكل أطعمة مطبوخة بالزيت (%)؟
7. أين تشتري طعامك (الجمعية، كارفور، إلخ...)؟
8. ما كمية الخبز الكويتي الذي تأكله (عدد المرات في اليوم) ؟
9. ما كمية اللحوم الكويتية التي تتناولها أسبوعيا؟
10. ما كمية الدجاج الكويتي الذي تتناوله أسبوعيا؟
11. كم كوب من الماء تشرب يوميا؟
a. أي نوع من الماء تشرب (مياه الصنبور أو نوع المياه المعبأة)؟
12. ما كمية منتجات الألبان الكويتية (حليب، لبن, روب، جبن) التي تتناولها في اليوم؟
13. كم مرة تأكل الأسماك في الأسبوع؟
a. ما نوعها؟

**نمط الحياة/الصحة:**

1. هل تسبح في بحر الخليج؟
السنة؟/الشهر/كم مرة في الأسبوع
2. ما برأيك سبب انتشار السرطان في الكويت؟
3. هل لديك تاريخ عائلي للسرطان؟
4. معظم المحاربين القدامى في حرب الخليج يعانون من متلازمة تسبب إعاقات. هل لديك فكرة عن متلازمة حرب الخليج التي توجد في الولايات المتحدة وفرنسا والمملكة المتحدة؟
5. هل تعتقد أن إصابتك بمرض السرطان مرتبطة بحرب الخليج (لمرضى السرطان فقط)؟

هل كنت هنا أثناء حرب الخليج؟ كم من الوقت؟

| Aug 90 | Jan 91 | Mar 91 | Nov 91 |
|---|---|---|---|

6. هل لديك أي حساسية؟ ما نوعها؟
7. هل لديك أي مشاكل صحية أو أمراض خطيرة أخرى؟
8. هل لدى أصدقائك أو أفراد عائلتك أمراض مثل داء السكري، السرطان، أمراض الجهاز العصبي (مثل التصلب العصبي المتعدد) أو أمراض خطيرة أخرى ؟
9. هل تعرف أي شخص مصاب بالربو؟

## VITA

Charles Cange is a doctoral candidate at the University of Washington. He received his masters degree in environmental sociology from the University of Paris. He has worked as a research scientist for the National Institutes of Health's nascent National Children's Study, a statistician for the Organization for Economic Cooperation and Development (OECD), and as a teaching assistant in the School of Public Health at the University of Washington. He also interned at the United Nations Environment Program (UNEP) Paris Office in 2004 and at the US State Department where he served in the Science, Technology and Non-Proliferation Office in Paris and drafted the Department's 2005 *Human Rights Report: Madagsacar* in Antananarivo.