Beirut, July 2012

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www.newweapons.org

Activities, research work flux and results, with Newweapons research teams

Newweapons is the core and idea of a research group which arose and is working since 2006 on the issues of war-related damages to health band physical integrity

It started in July 2006 during the Israeli war to Lebanon and the attacks to Gaza in response to calls from local Doctors asking help to the international scientific community

”we never saw before wounds and dead like those we receive now in the hospital.
Can you help understanding which are these new weapons that cause them? We need help to understand how to treat the victims."

many of the victims were in both places women and children.

The information received from doctors in Lebanon and Gaza reported of **unusual traumas** and **unusual deaths, suggestive of novel causes and weapons**.

"***many of the wounded and dead did not present any fragments of weapon in their bodies"***,

of "***wounds with entrance holes and no exit holes",***

of "***severe amputations without shrapnel and burns which do not stop burning"***.

Of "***sudden death of the patients of unknown causes"*** after traditional and apparently resolutive medical or surgical treatments,

of" ***degeneration, almost rottening of internal organs"*** at autopsy of these patients.

Since 2006 we had a number of missions in Lebanon and to Gaza and a collaboration with Iraqi doctors.

Beirut

south Lebanon

Tyre

Gaza

Gaza

Some of the victims of “not fragmentation” weapons in July 2006

All clinical information and most of the pictures I will show in this presentation were given to us with permission to use them by Medical personnel

Newweapons is as small group of of voluntary scientists, doctors and other experts aggregating:

-with local professionals.

-with a “variable” set up of the working teams for each project.

-each time including the competences, methodologies and lab facilities required for the specific project.

We sit “*on the other side of the weapons”*, on the side of the victims.

We have no formal status of association, and up to 2010, have self-financed our work.

Funding is always an issue for this type of research which is not easily accepted by usual funding sources.

Activities of Newweapons teams in time included:

-***Production of protocols*** for first response and methodology for biopsies preservation, not invasive collection of biological samples and of environmental speciments.

-***Identification of weapons*** involved in the attacks, with doctors in emergency settings and by literature search and in the field.

-***Witness*** to Tribunal on Israeli war crimes in Lebanon, Bruxel 2007 and in Tribunal on war crimes, Kuala Lumpur, Malaysia 2007

-***Identification of the components of new weapons-*** by analytical chemistry techniques

-***Analyis of bioptic and biological samples***- by chemical, histologic and Scansion Elettromiscopic techniques.

-***Study of the permanence of toxicants*** from weapons in the environment- by chemical techniques.

Study of the permanence of toxicants from weapons in the people's bodies- by chemical techniques.

-***Investigation of long term effects*** of the wars on health through study of reproductive health- by a combination of clinical, genetic, chemical tools.

-***Publications in international science journals***

-***Seminars in universities and at scientific congresses***

The initial investigations in 2006 were directed to the collection of medical, field and witness evidences towards the identification of the weapons used in Lebanon.

A report is available at www.newwweapons.org

Report to the International Citizens Tribunal on Israeli war crimes in Lebanon. P.Manduca

Soon we understood that many non fragmentation weapons had been used, built like the children game Lego, i.e. variations of the same basic principle, and from our point of view it became more relevant to prove what they contained and how we could prove it.

Background of the work developed after 2006

The **novel weaponry** implemented in the field in these last wars, is primarily "non fragmentation weaponry".

This kind of weapons is responsible of the "unusual wounds" reported by doctors.

The novelty of these weapons and of their immediate effects derives from :

-metal augmentation, that is the addition of, or substitution of the fragmentation blast in ammunitions with metal in powder form, which at blast are delivered at high speed and heat

-directionality of the delivery of the concentrated metal particles by the use of shaped charges, devices that direct the path, intensity and distribution of the metal powder at the explosion.

-In these wars continued the use of heavy and toxic metals in "penetration" weapons.

- With time after the recent conflicts doctors reported increase of problems in reproductive health (late miscarriages, congenital malformations), of cancer and of chronic diseases.
- The increase in diseases in time correlates with the fielding of the new “metal augmented” weapons since the nineties.
- The most dangerous possible elements for health in the long term from these weapons are the metals they contain.
- Not only DU or uranium or tungsten, but many other metals are used in weaponry and have high toxic effects in both animals and humans.
- These are teratogens and carcinogens, cause chronic pathologies, and are delivered by weapons in combination.

Metals in weapons, characteristics:

-they persist in the environment
-they accumulate in the body
-they are toxicants, carcinogens and teratogens (induce structural birth defects passing through the placenta)
-they affect multiple cellular functions
-they act as pseudo estrogens, altering the hormone activity that governs developmental events in embryogenesis
-they can cause inheritable mutations directly and indirectly, via epigenetic mechanisms, affecting gametes, embryo and cell of the body, thus reproductive health and tumor development.

The known effects in animals and men of the metal components of the new weapons suggest that they can be the effectors of long term negative health effects

As scientists, we asked ourselves how we could investigate and produce proofs about the metals in the weapons that cause the new kind of wounds and find evidences that they pose risks in the long term for the health of people.

We serched answers to these questions:

-Can we prove that metals are delivered in the bodies of victims by non fragmentation weapons?

-Can we prove that metal powders are delivered in environment by weapons?

-Are these metals accumulated in the bodies of people after the war?

-Are there effects of war on long term reproductive health and/or tumors?

-Is there a correlation between exposure to war events/continuing contamination of the environment post war, and long term health damage?

Only getting these answers we can then approach prevention and remedation studies

Summary of what was published with local professionals by the team of Newweapons

Proof of fact of the presence of metals in wounds by not fragmentation weapons, Gaza, Palestine

Metals detected by ICP/MS in wound tissue of war injuries without fragments in Gaza

.Skaik S, Abu-Shaban N, Abu-Shaban N, Barbieri M, Barbieri M, Giani U, Manduca P. BMC Int Health Hum Rights. 2010 Jun 25;10:17.

Presence of metals in bomb craters, Gaza, Palestine

Presence of metals in WP shells, Gaza, Palestine

Gaza Strip, soil has been contaminated due to bombings: population in danger .

Manduca P, Barbieri M, Barbieri M http://www.newweapons.org/?q=node/110#attachments, January 2010

Presence of metals and persistence after one year from Cast Lead in children hair, Gaza, Palestine

Metals detected in Palestinian children's hair suggest environmental contamination.

Manduca P, Barbierihttp://www.newweapons.org/?q=node/112, March 2010

Birth defects study in Falluhja, Iraq

Four polygamous families with congenital birth defects from Fallujah, Iraq.

Alaani S, Savabieasfahani M, Tafash M, Manduca P. Int J Environ Res Public Health. 2011

Presence of metals in 2010 in hair of families with birth defects , Falluhja, Iraq

Passage of metals to foetus, Falluhja, Iraq

Increase in time of birth defects and miscarriages in Fallujah since 2003 and its association with toxic metals load in the population and in newborns and children with birth defects and their families.

P. Manduca. http://newweapons.org/?q=node/120 March 2011

Registering birth defects in Gaza

Major structural birth defects (BD) in 0-2 year old children in the Gaza strip: prevalence, types and regional differences.

Yehia Abed 1,Nabil Al Barqouni2, Paola Manduca3, Roberto Minutolo4, Mofeed Mokhallati5., Awny Naim6- Lancet Palestinian alliance, Beirut 2012*

Birth defects in Gaza: prevalence, types, familiarity and correlation with environmental factors.

Awny Naim[1], Nasser Abu Shaban[2,] Hedaya Al Dalies[3], Fadi El Hayek[3], Raneem Al Shawwa, Mohammed El Balawi[3], Eman Salem[3], Kholoud Al Meziny[3], Roberto Minutolo[4], Paola Manduca[5]Lancet Palestinian alliance, Beirut 2012

Association of exposure to white phosphorus and birth defects, Gaza, Palestine

Birth defects in Gaza: prevalence, types, familiarity and correlation with environmental factors.

Awny Naim[1], Hedaya Al Dalies[3], Fadi El Hayek[3], Raneem Al Shawwa, Mohammed El Balawi[3], Eman Salem[3], Kholoud Al Meziny[3], Roberto Minutolo[4], Paola Manduca[5], IJERPH, published May 7, 2012*

1
Proof of fact of the presence of metals in wounds by not fragmentation weapons, Gaza, Palestine

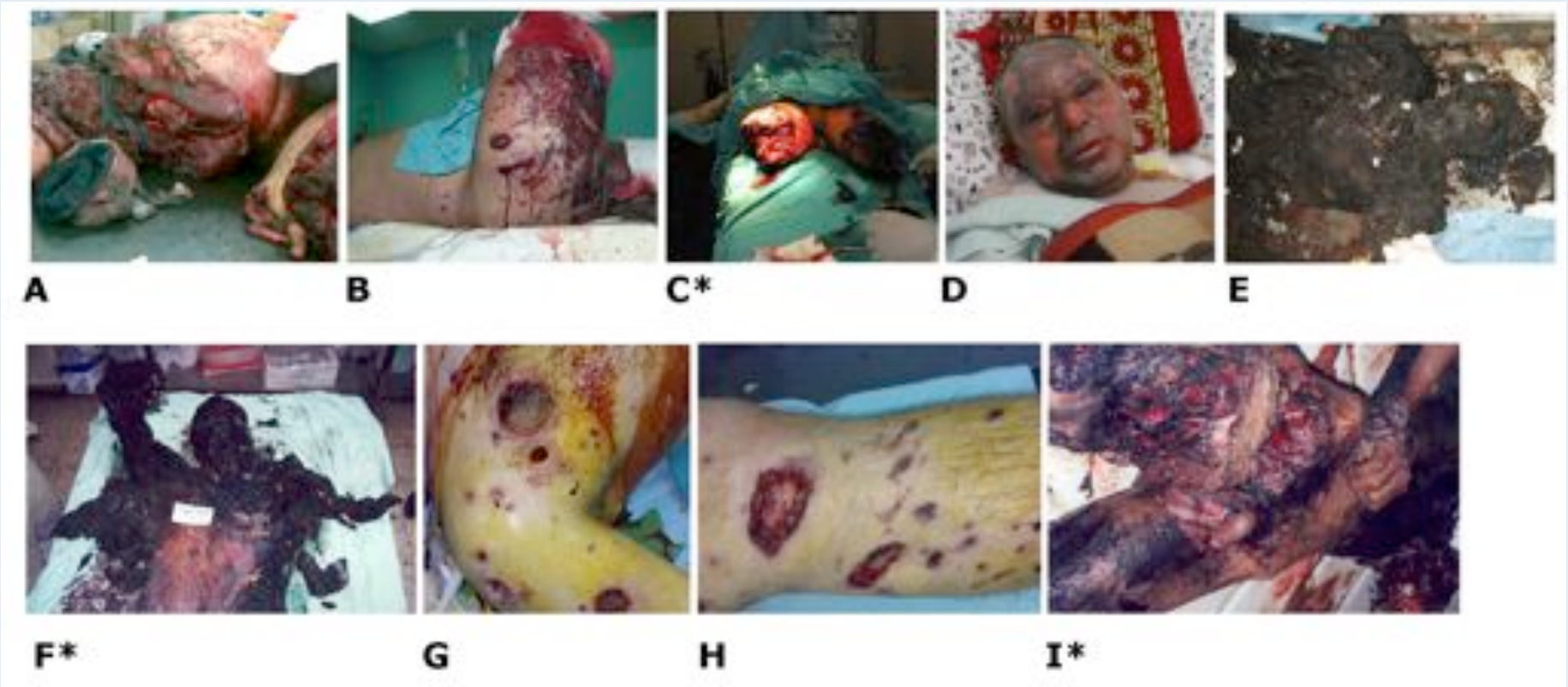
Metals detected by ICP/MS in wound tissue of war injuries without fragments in Gaza. *Skaik S, Abu-Shaban N, Abu-Shaban N, Barbieri M, Barbieri M, Giani U, Manduca P. BMC Int Health Hum Rights. 2010 Jun 25;10:17.*

Metals were detected and their quantity measured in different type of wounds caused by "not fragmentation weapons" in victims of 2006 and 2008/09 Israeli attacks in Gaza.

This gave proof of fact that toxic metals are delivered by the non-fragmentation weapons causing amputations and charring.

Each type of wound showed different kinds and levels of metals, toxicants, carcinogen and teratogen.

Among the wounds studied, white phosphorus burns also contain a typical metal signature, different from that of weapons causing amputating or charring.


A
B
C*
D
E
F*
G
H
I*

Classification of biopsies obtained from different type of wounds, and clinical observations
A – mono or bilateral amputations by weapon of lower limbs throughout the bone, showing sharp rescission or with shredded flesh. Often presenting also punctuated round holes in the pubis. No metal fragments detectable by X rays or by surgical inspection. occasional unexpected death after surgical resolution.
B – burn injuries, of different extent and depth. Biopsy were from the burnt skin, less that 3rd grade, not self igniting material.
C – deeply burned bodies, charred to the bone. Biopsies from the muscle underneath the burn and from the exposed burnt lamellar bone.
M – multiple and diffuse burn injuries with roundish shape and devoid of shrapnel at inspection. Self igniting clumps of White phosphorus were extracted from the wound. Biopsies included the rim of wounds .

We analyzed for metal content fragments dissected from 18 biopsies derived from 15 victims of war-derived injuries, in 2006 and 2009.

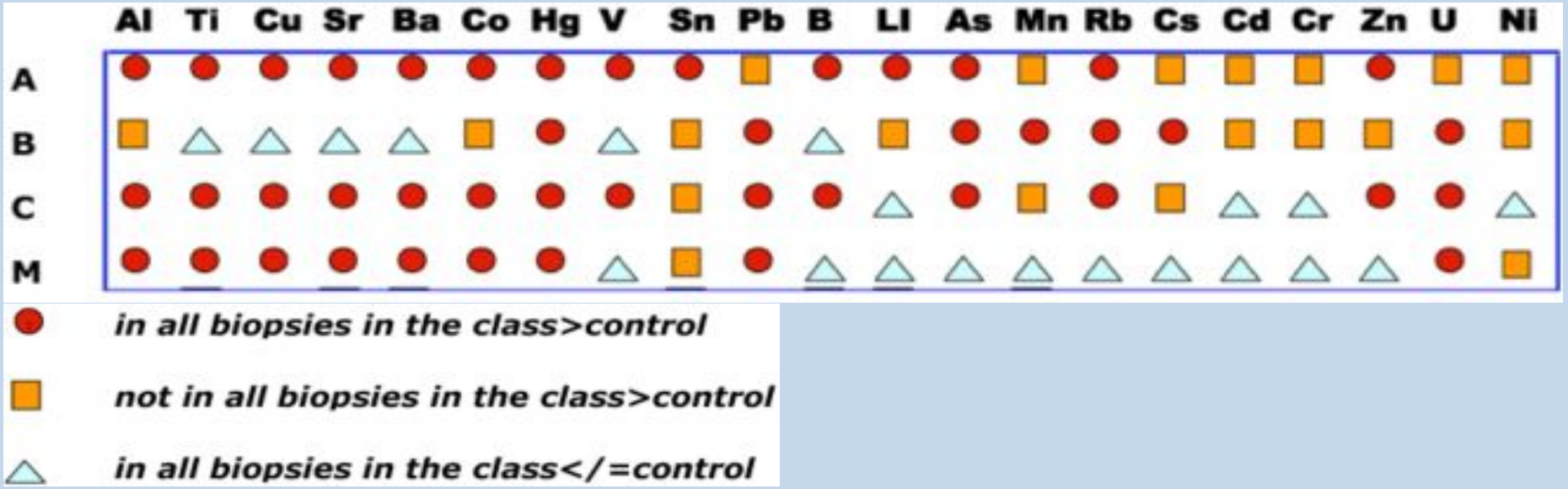
The kind of teratogen and carcinogen metals detected in wound tissues from injuries

Amputee &Carbonized : Al*, Ti, Cu, Sr, Ba, Co, Hg*, V, Cs, Sn , Pb*, U, B, As, Mn, Rb, Cd, Cr, Zn
Multiple dots wounds by WP: Al*, Ti, Cu, Sr, Ba, Co, Hg*, Pb* , U
Burns wounds: Co, Hg*, Cs, Sn
in wounds of class A only: Ni

Blue =carcinogens, potential carcinogens and teratogens
Green = carcinogen if in some form
Red = teratogens
*** known to cross placenta**

We do not know the chemical form or the aggregation state (particles, nanoparticles, elemental) of the metals detected, which may influence their biological effects.

Quantities of each metal for weapons that cause different kind of wounds



Kind and amounts of metals correlate with the clinical classification of injuries, exposing a specific metal signature for each kind of wound and similar for biopsies from 2006 and 2009.

Skaik S, Abu-Shaban N, Abu-Shaban N, Barbieri M, Barbieri M, Giani U, Manduca P. Metals detected by ICP/MS in wound tissue of war injuries without fragments in Gaza. BMC Int Health Hum Rights. 2010 Jun 25;10:17.

Metals present in the weapons may have carcinogen, teratogen and toxic implications for the wounded that inhaled them and have them in their flesh.

At the same time these metals are likely to have been spread and persist in the environment posing the issue of environmental contamination and of assumption by the wider population.

What other sources of metal contamination due to war could be demonstrated in the environment?

2-Presence of metals in bomb craters, Gaza, Palestine

Gaza Strip, soil has been contaminated due to bombings: population in danger *. Manduca P, Barbieri M, Barbieri M http://www.newweapons.org/?q=node/110#attachments, January 2010*

Toxicant metals found in bombs craters in Gaza

4 craters were tested, two from bombing in 2006 and two from bombing in 2009.

In all craters: molybdenum, between **25 and 3000 fold expected** and **aluminum** in very high amounts
Molybdenum is toxic, interferes with spermatogenesis and is a known teratogen in animals. Aluminum is neurotoxic. Both penetrate also through the skin and reach the placenta.

In one crater of 2006 at **Beit Hanoun tungsten (20-42 fold expected) and mercury (8-16 fold)** were detected.
M*ercury is carcinogen. Tungsten is genotoxic and potential carcinogen and is responsible of respiratory and neurological pathologies.*

In one crater of 2009 at Tufah cadmium (7,3 fold expected) was detected. *Cadmium is carcinogen*.

In both crater at Tufha 2009 also **cobalt** (**2-5,1 fold expected**) was detected. *Cobalt is carcinogen*.

Analysis by ICP/MS. reference values are from a soil survey in 2005 of 170 location in the strip of Gaza (Shomar et al). www.Newweapons.org

3-Presence of metals in WP shells, Gaza, Palestine

Gaza Strip, soil has been contaminated due to bombings: population in danger. *Manduca P, Barbieri M, Barbieri Mhttp://www.newweapons.org/?q=node/110#attachments, January 2010*

Analysis by ICP/MS for 34 metals of the powder contained in an exploded WP ammunition THS89D112-003 155MM M82561 produced in Luisiana, USA by Thiokol Aereospace

In the powder contained in the WP ammunition were detected

Aluminum in very high amounts (*218,000-524,000 ppb)*.

Molybdenum (*average 660 ppb and 200x expected in soil,)*,

Tungsten (*average 352,000 ppb and 41x expected in soil)*

Mercury (*average 1620 ppb and 160x expected in soil)* were also detected in unusually high amounts.

During Cast Lead was reported that about 3500 ammunitions were fired

The radius of diffusion of the WP filters given by the manufacturer is 250-500 meters

Worries of metal contamination due to the use of these ammunitions are justified.

The same ammunitions were used in Gaza and Fallujah.

In conclusion, we documented delivery of many toxic metals by not fragmentation weapons, bombs and WP ammunition in Gaza in 2006 and 2008/9.

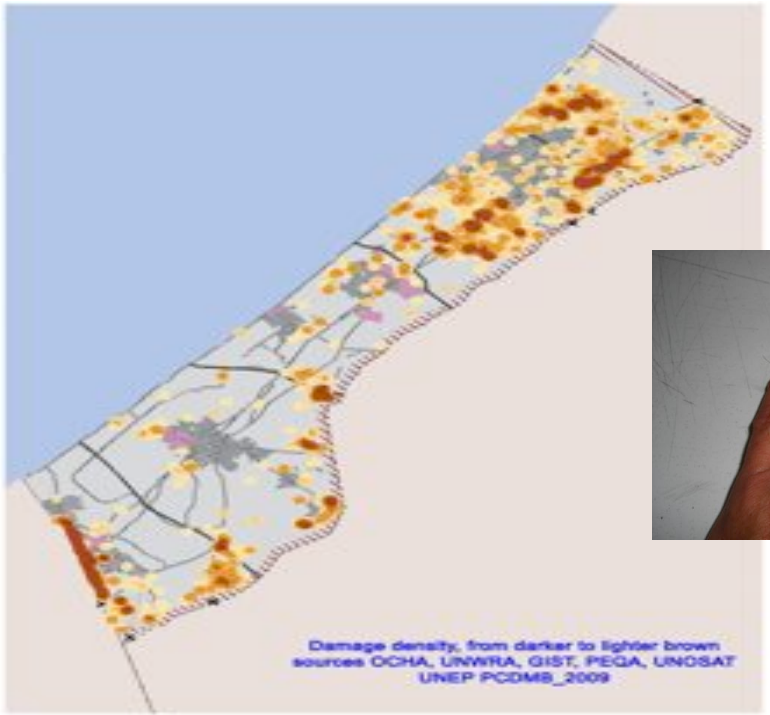
The next step was to test, as first end effect, if these metals were entering and remained in the body of people, one year from the attacks in Gaza.

The simplest not invasive way to do so, is to determine the content of metals in hair, as an indicator of assumption by the body from the environment.

This was done by inductively coupled mass spectrometry (ICP/MS), according to IAEA (International Atomic Energy commission) and analyzed in comparison with controls from area not affected by war.

4 - Presence of metals and their persistence in children's hair 1year after Cast Lead, Gaza, Palestine

Metals detected in Palestinian children's hair suggest environmental contamination.
Manduca P, Barbieri M, Barbierihttp://www.newweapons.org/?q=node/112, March 2010



We tested for environmental contamination measuring the accumulation in hair of 95 people, mostly children and few women.

We detected presence of toxic metals in the hair of 60 of the 95 people tested at a distance of one year from the aggression.

uranium, cadmium, tungsten, cobalt, molybdenum and vanadium

these metals, components of weapons, **persist in the environment and are distributed differently** in different areas of the Strip

The area of Gaza Zeitun, was more contaminated than Beit Hanoun, further north

W *
Pb *
U *
Be* GZ > BH = BL
Cr*
Co

V *
Sr*
Mo* GZ > BH > BL
Cd+
As+
Mn +

Al very high in all samples

Also in WP ammunition

Blue carcinogens-
red toxic-
green possible carcinogen

* Values higher than analytical Control *and* world sampling averages.

Summary for weapon-derived toxicant metals in Gaza strip after Cast lead

2008-09 Gaza -Cast lead- metals detected, *data by NWRG*

	Al	Hg	W	Mo	Cd	Co	U	V	Sr	Cu	Ba	Sn	Pb	Ni	B
craters 06-09	yes	yes	yes	yes	no	yes	no	no	no	no	no	no	no	no	no
hair fall09	yes	no	yes	yes	yes	yes	yes	yes	no	no	no	no	no	no	no
WP shell 09	yes	yes	yes	yes	no	no	no	no	no	no	no	no	no	no	no
WP wound 09	yes	yes	no	no	no	no	yes	no	yes	yes	yes	yes	yes	yes	no
Amputations	yes	yes	no	no	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes
Carbonized	yes	yes	no	no	no	no	no	yes	yes	yes	yes	no	yes	yes	yes
lesser burns	no	yes	no	no	no	no	no	no	no	no	no	no	yes	no	no

Aluminum, Mercury, Tungsten, Molybdenum, Cadmium, in craters

Aluminum, Cadmium, Tungsten, Molybdenum, Cobalt, Uranium, Vanadium in hair

Aluminum, Mercury Tungsten, Molybdenum in WP ammunitions

Aluminum, Mercury, Uranium, Strontium, Copper, Barium, Tin, Lead, Nickel, Titanium, in WP wounds

Aluminum,, Mercury, Cadmium, Cobalt, Uranium, Vanadium, Strontium, Copper, Barium, Lead, Nickel in amputations

Aluminum, Mercury, Vanadium, Strontium, Copper, Barium, Lead, Nickel in carbonized

Mercury, Lead in bur n s

yes=above control

no= similar to control

yes = little above control

	toxic fetotox					toxic
	carcino genic					
	possible carcino genic					

Problems: Hareetz intimidation and defamation, phone tapping

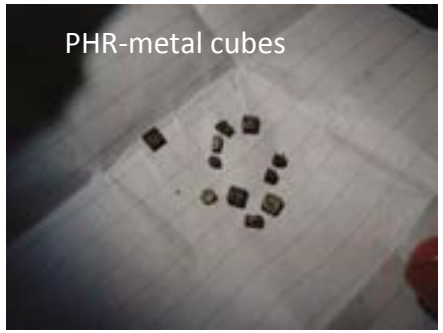
Gaza -Cast Lead- other metals, in pieces of different sizes, delivered by weapons other than non fragmentation weapons can pose problem for the victim's health if they remain in the body.

Human Rights Watch Report- small cubes that function as flechettes- analyzed contain Tungsten, Photos also in the Phisicians from Human rigths report. April 2009.

Pysicians for Human rigths, April 2009, unknown metal, small cubes

Goldstone commission, september 2009 - small cubes in Tungsten alloy

USA made-Hellfire ammunition, by Amnesty Int.


PHR-metal cubes


PHRmetal cubes in the body by X ray

Thus, in Gaza after Cast Lead weapons-derived metals are in the environment in a form that is assumed by people

These metals found **can cause inheritable mutations directly and indirectly, via epigenetic mechanisms, both in the gametes, the embryo and the cells of the body, affecting reproductive health and inducing tumor development.**

Thus, one could approach to study the effect in time of exposure by studying as **end point** if there **is increase in cancers or in damages in reproductive health.**

We chose to start investigating reproductive health because of ongoing, but undocumented, reports of effects on it from Iraq, and because we consider a priority its protection.

End point reproductive health- Methodology

1- Retrospective studies: collect the information available already in hospital's registers.

Useful for obtaining prevalence rate, sex ratio, diagnosis, sometimes residence. Prevalence is related to different parameters, according if late miscarriages and selective termination of pregnancy are recorded and performed in the structure.

Usually no environmental exposure is recorded, nor reproductive history of the couple and information about intermarriage and health of relatives.

2- Prospective studies: register of children at delivery in maternities or clinics.

This approach allows to design the protocol according to the specific needs and to collect information about family history of reproduction and of residence, about exposures to critical events like wars, and to collect health information about kin of first and second degree.

Major structural congenital Birth defects (BD), some characteristics

- Major structural BD are changes in body structure, organ functionality, occurring during embryonic and, less often, fetal development.
- Very few BD are due to a single gene mutation.
- In some cases they are due to concomitant mutations in few genes.
- In the majority of cases there is no known genetic damage.

- In the majority of cases BD occur sporadically and "maternal" effect and external environmental effectors" are implied.
- BD can be induced by agents that are also carcinogens.
- The induction of BD by external effectors is dependent from the agent, its amounts, its capability to reach the embryo and the time where the embryo is exposed during pregnancy

We produced protocols for registration at birth according to international standards and inclusive of local habits, religion, events of war or of environmental relevance. We used them in Fallujah in 2010 and Gaza 2011.

In the protocols are included :

-**Questions as by international standard register, and diagnosis with classification** of major structural birth defects according to Eurocrat, ICD10 – ***comparison with the rest of the world are made possible.***

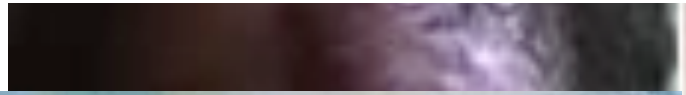
-**Information on familiarity of birth defects** – *the pedigree analysis and the kin health-related information allows to* ***understand if there are pre-existing genetic damages.***

-**Questions about eexposure to environmental events** – ***to establish correlations and work towards methods to determine cause-effect relationships***.

-**Historical residence of couples with birth defects**- *to understand if there are clusters of events in a territory* ***and to establish correlation between residence and environmental effectors*** *that can be cause/con-cause of birth defects*.



Iraq, 2009



5- Birth defects in Fallujah, Iraq- Families study

From Iraq arrived news of degeneration of reproductive health, increase of birth defects and late miscarriages and of increase in cancers.

We collaborated with colleagues in Fallujah General Hospital for two studies.

The first directed to understand if birth defects reported were due to familiarity and pre-existing genetic background of the couple or were novel events, using the reproductive history of polygamous families with birth defects.

Figure 2

Iraq 2010

In this first study we show that birth defects are sporadic events not related to the couple's genetic background, but possibly due to exposure to environmental teratogens.

Four polygamous families with congenital birth defects from Fallujah, Iraq. *Alaani S, Savabieasfahani M, Tafash M, Manduca P. Int J Environ Res Public Health. 2011*

Problems: USA services, intimidation and defamation.Hacking.

6- Presence of metals in 2010 in hair of families with birth defects , Falluhja, Iraq
Passage of metals to foetus, Falluhja, Iraq

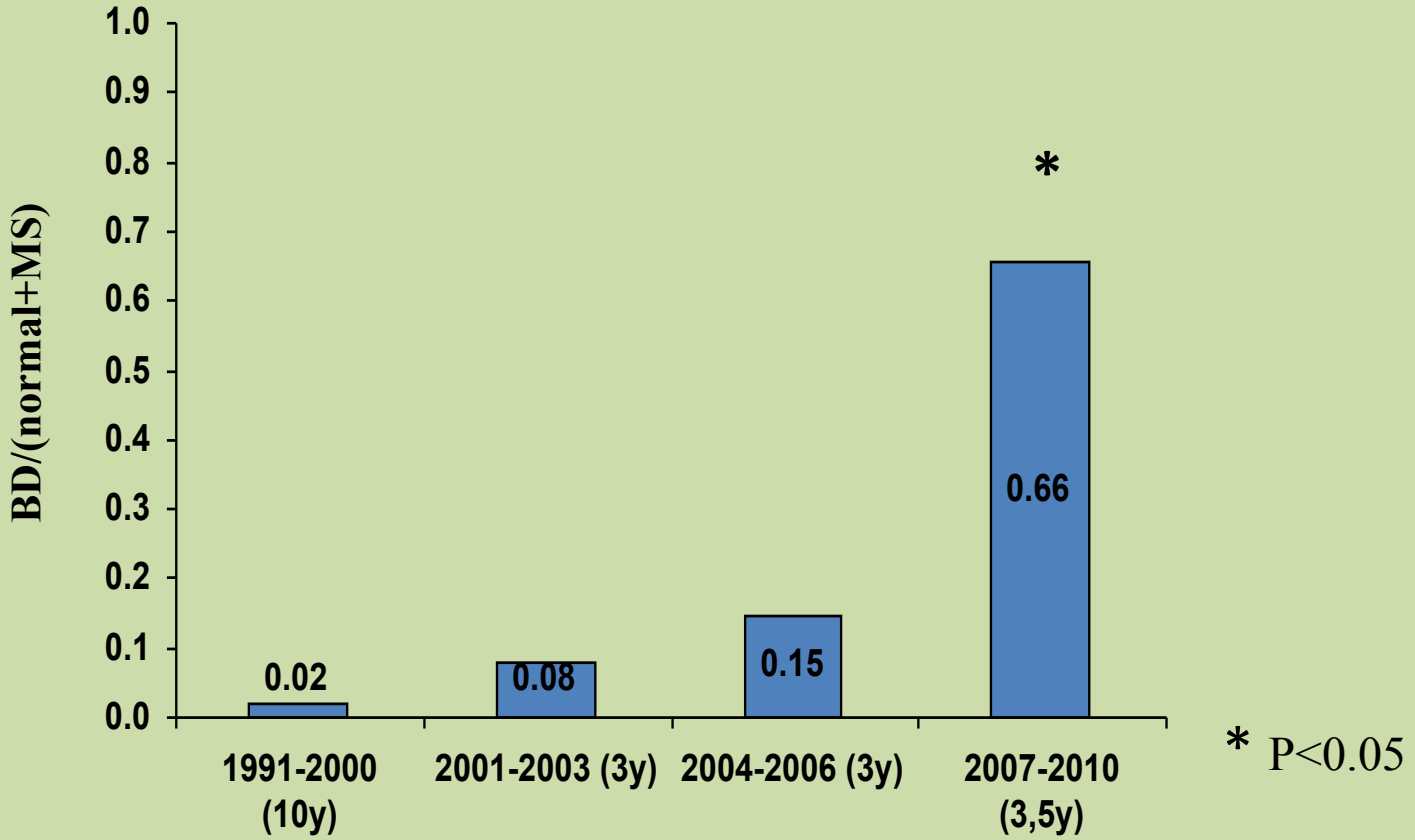
We used a questionnaire developed by us for this study where we also required information on

-family reproductive history
-intermarriage between parents
-first and second grade kin health
-historic residence
-exposure to war attacks (bombing and White phosphorus) in 2004 and 2005

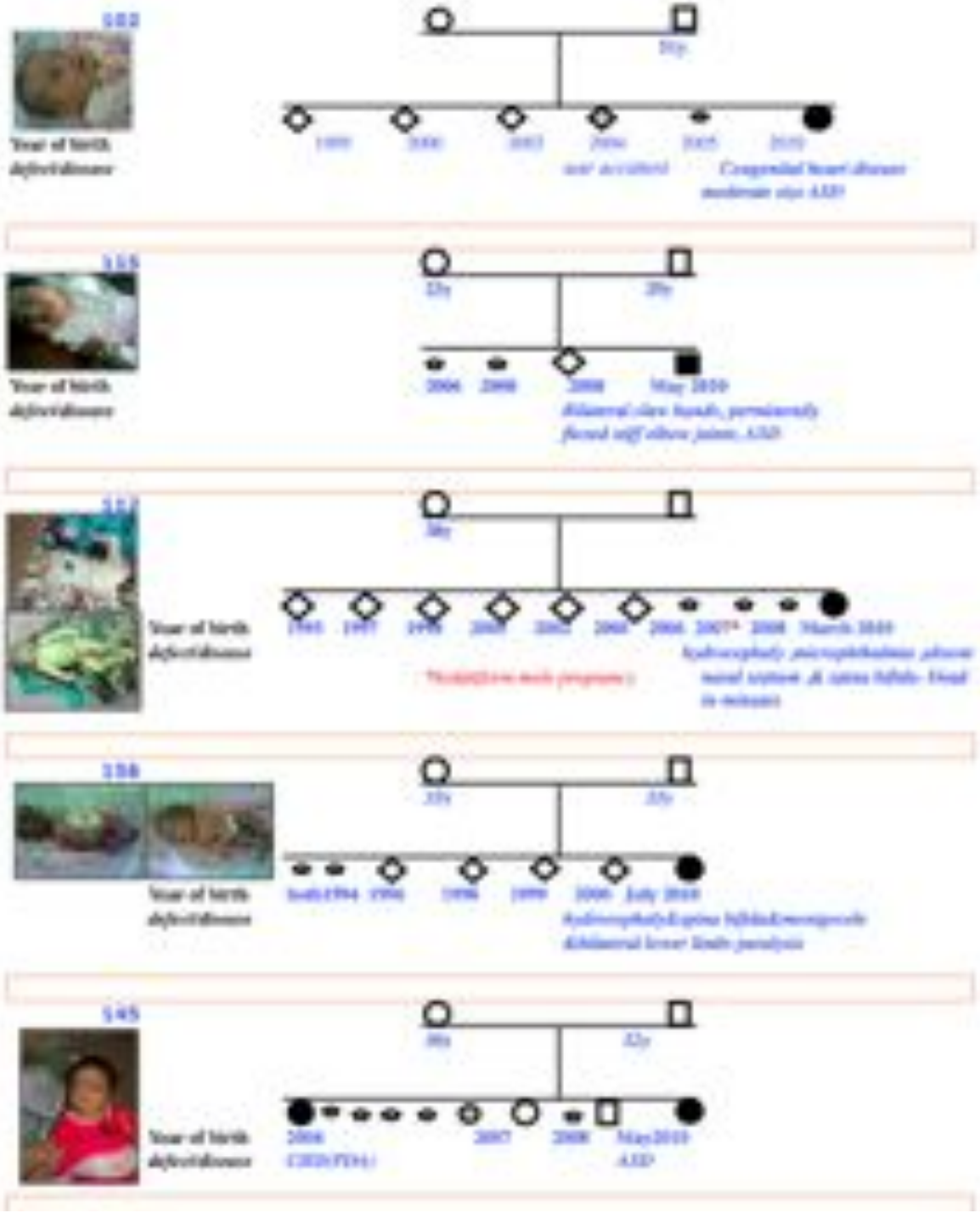
These information allowed to define the changes in time of frequency of birth defects since 2001.

It confirmed, on a larger sample (56 families with BD), the lack of familiarity and the sporadic and casual appearance of BD in the progeny of a couple.

We show that increase in prevalence of birth defects started after 2004 and was ongoing in 2010 by tracing back the reproductive history of the families with birth defect children.



Increase in time of birth defects and miscarriages in Fallujah since 2003 and its association with toxic metals load in the population and in newborns and children with birth defects and their families. *P. Manduca. http://newweapons.org/?q=node/120 March 2011*



Examples from a 56 cases study. Manuscript in preparation. Manduca P. et al.

Source
Dr.Alaani and Tafash

The large majority of families in Fallujah had stable residence since 2003 and reported exposure to bombing and WP:

EXPOSURE TO WAR EVENTS

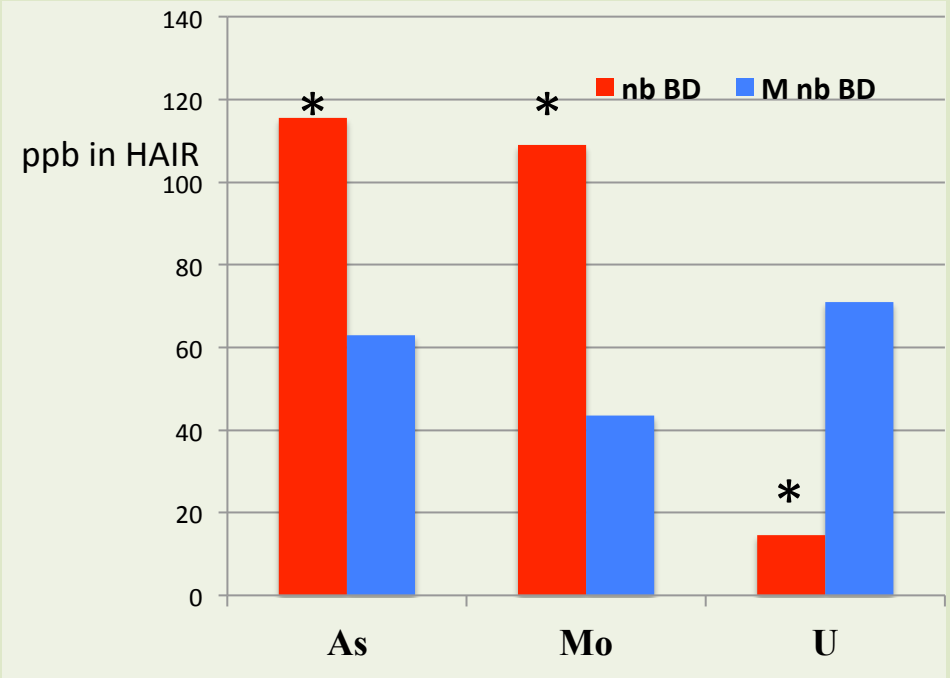
56 couples with BD							
house/vicinity bombed - bombed and WP		**WP or Burned - only WP**		**rescue/rubble clearing**		**acute symptoms**	
41 (73%)	**9 (16%)**	**11 (19.6%)**	**2 (3.5%)**	**38 (68%)**		**15 (26.7%)**	

We also measured by analytical chemistry the load of metals in hair of the parents and children with BD, including 32 newborn and 24 children between 6 months and 7 years of age.

We show an **high load of 10 toxic-carcinogen and teratogen metals found in weapons** in the hair of couples and newborn children of Fallujah, showing they **continue to assume these from contaminated environment.**

Most of the metals, passage from mother to fetus during pregnancy.

Some of them are also **preferentially accumulated in the fetuses with birth defects molybdenum (Mo) and arsenic (As)**, not vanadium, chromium, mercury, cobalt, lead, cadmium, and tungsten. **Uranium (U)** does not reach in the child concentration as high as in the mother's.



red- newborn with birth defect

blue-their mothers

* $p<0,005$

In summary, we learned from these studies in Fallujah

- That birth defect prevalence has increased since 2004 to reach a value that doctors there report to be far higher than elsewhere. This is consistent with continuing exposure to toxic contaminants.

- The modality of presentation of the birth defects and the family history, fail to detect pre-existing genetic factors and is consistent with presence of environmental contaminants.

-The increase of birth defects is accompanied by high metal load for 10 toxic metals in the population, showing their persistence in the environment to date.

-Arsenic and molybdenum specifically accumulate in the fetuses, compared to their own mothers. These are fetotoxic and affect gene expression.

Problems: USA services, intimidation and defamation from Iraq. Withdraw of Iraqi doctors.

a controversy

Uranium and other contaminants in hair from the parents of children with congenital anomalies in Fallujah, Iraq Samira Alaani1, Muhammed Tafash1, Christopher Busby2*, Malak Hamdan3 and Eleonore Blaurock-Busch4 Conflict and Health 2011, 5:15

sample	238U ppb	235/238	236/238	238/235	2 SD
155C	6.07	0.007242	<0.000001	138.08	2.56
155F	200	0.007274	<0.000001	137.48	0.3
155M	112	0.007254	<0.000001	137.86	0.4
153C	32	0.007259	<0.000001	137.77	0.44
153F	88.6	0.007246	<0.000001	138	0.42
153M	65.5	0.00726	<0.000001	137.74	0.4
110 C	66	0.007254	<0.000001	137.85	0.42
110F	39.5	0.0073	<0.000001	136.98	0.48
110M	251	0.007258	<0.000001	137.78	0.4
104F	177	0.007273	<0.000001	137.5	0.42
104C	290	0.007257	<0.000001	137.8	0.4

With Prof.R.Parrish, Nerc, UK

Starting to set the ground at the appropriate time

Genetica, Facoltà di Scienze, Genova, Italy

Palestinian Energy Authority, Gaza,
Al Shifa Hospital, Nasser Pediatric Hospital, Medicine Faculty, IUG and Public Health, Al Quds University, Gaza, Palestine

Nephrology, University of Naples, Italy

The main aim of our studies in Gaza, was to monitor the situation and establish a reference point about incidence of birth defects. We also studied correlations of BD incidence with exposure to war.

7-Retrospective study in pediatric hospitals

Aims

Measure prevalence of birth defects in the 0-2years old Pediatric patients.

Start of a register for the Gaza strip and classification for birth defects of Pediatric patients.

Results

Prevalence of Major Birth Defects reported in 0-2y old children that required assistance in the 5 major Pediatric hospitals and in associated surgeries in Gaza Strip 7.14%.

Total 0-2 year old patients	**in pediatrics and surgeries**	**5302**
BD patients in pediatrics and surgeries		**379**
frequency of BD		**7 ,14%**
first semester of 2010		

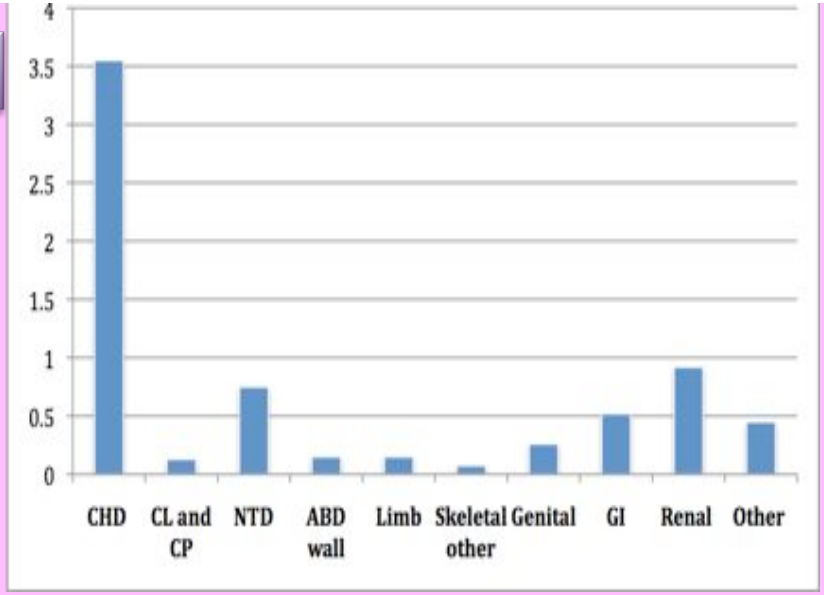
Classification of the BD according to primary defect, as by ICD10 shows prevalence in decreasing order of presentation: CHD, Renal, NTD, GI, Others/multiple, Genital, ABD, Limb, CLP/CP, Skeletal/other than limb.

2010 is the first year where we could collect full information from 5 Pediatric Hospitals of the Strip.

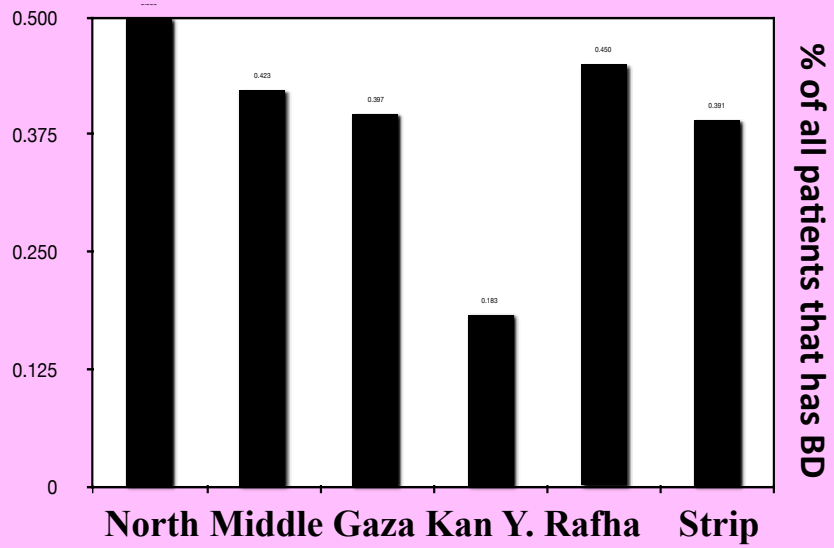
The registration should in 2012 be established with same format in all pediatric

Type of BD detected in pediatric and surgeries →

Prevalence data for this age group are not available from other countries with similar ethnic, cultural and economic situations, so direct comparison cannot be done.



Regional differences in the presentation of BD



Khan Younis shows the lowest prevalence, North the highest, both significantly different from Gaza and Middle area ($p<0.001$).

Major structural birth defects (BD) in 0-2 year old children in the Gaza strip: prevalence, types and regional differences. *Yehia Abed 1,Nabil Al Barqouni2*, Paola Manduca3, Roberto Minutolo4, Mofeed Mokhallati5., Awny Naim Lancet Palestinain Alliance, Beirut, March 2012*

8– Prospective study
Registration at birth in Al Shifa Hospital

Aims-
To establish methods and protocols for registration at birth.
To measure incidence of BD and study the familiarity of birth defects and other reproductive outcomes and failures.
To assess exposure of parents to Cast Lead weaponry.



Al Shifa hospital is the largest maternity of the Gaza strip, serving the Gaza city and nearby areas, with 18.000 births in 2010 and 30% of the whole births in the Strip.

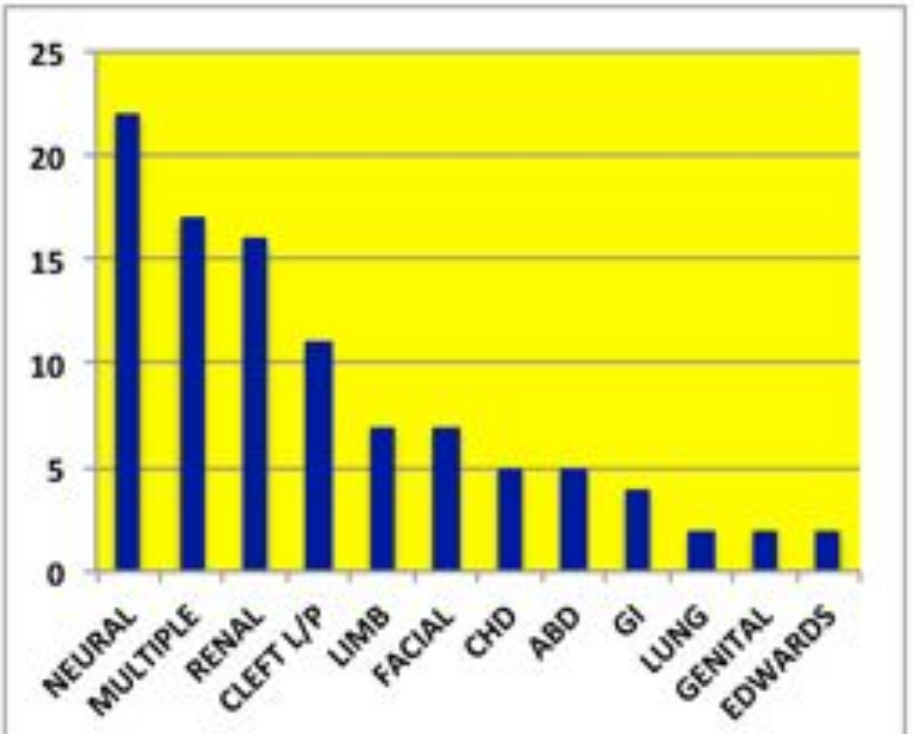
Incidence of birth defects registered in al Shifa were 1,4% in 2011; this is an under estimate due to lack of instrumental diagnosis for cardiac malformations (possibly 25-30% of the total BD, as from data from the Pediatric hospitals of the whole Strip, which would rise the incidence to about 1.8- 2%).

New born	Normal	Birth defect	Miscarriage	Premature	Still born
Total born	3811	55	94	77	30
incidence/100	974,6	1,4	2,33	1,96	0,74
Ratio M/F	1[b]	0,94	1,1	0,67	0,88
% couples of first cousins	27	29	36,1	13,3	30

Incidence of birth defects is not related to intermarriage rate, is equal for the sexes and unrelated to recurrence in the collaterals of 1° and 2° degree.

Distribution of types of birth defects registered at birth shows high incidence for a known regional polymorfism for polycystic kidney and was underextimated for cardiac malformations.

Type of BD	relative %
NEURAL	22
MULTIPLE	17
RENAL	16
CLEFT L/P	11
LIMB	7
FACIAL	7
CHD	5
ABD	5
GI	4
LUNG	2
GENITAL	2
EDWARDS	2



Exposure to war attacks is strongly correlated with occurrence of birth defects.

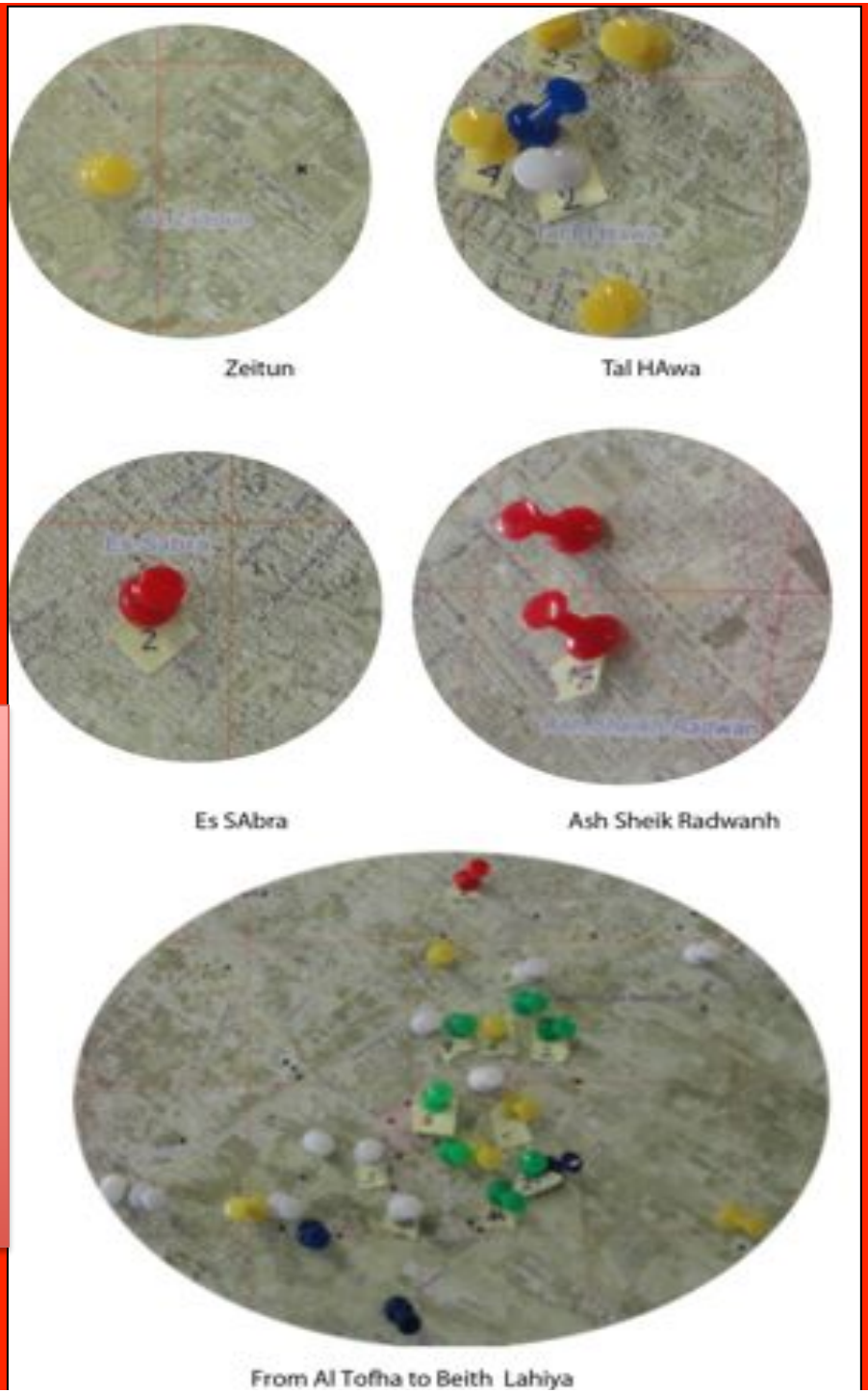
EXPOSURE		None		only WP**		only Bombed		WP and Bombed	
CHILD	Total	Number	Prevalence (95% CI)	Number	Prevalence (95% CI)	Number	Prevalence (95% CI)	Number	Prevalence (95% CI)
NORMAL	2933	2884	98.3 (97.9-98.8)	49	1.7 (1.2-2.1)	N/A		N/A	
BD	44	19	43.1 (28.5-57.8)	12	27.2 (14.1-40.4)	9	20.4 (8.5-32.4)	8	18.2 (6.8-29.6)
OVERALL	2977	2903	97.5 (97.0-98.1)	61	2.0 (1.5-2.6)				

Reported exposure to WP during Cast lead aggression was registered for 3 months for all the mothers in the delivery room. For families of BD children it was registered exposure to WP and to bombing for five months. N/A not available * Prevalences are expressed as percent of respective total and 95% Confidence Intervals **The difference between exposure for parents of BD children versus those of normal children is highly significant, $p<0.001$.

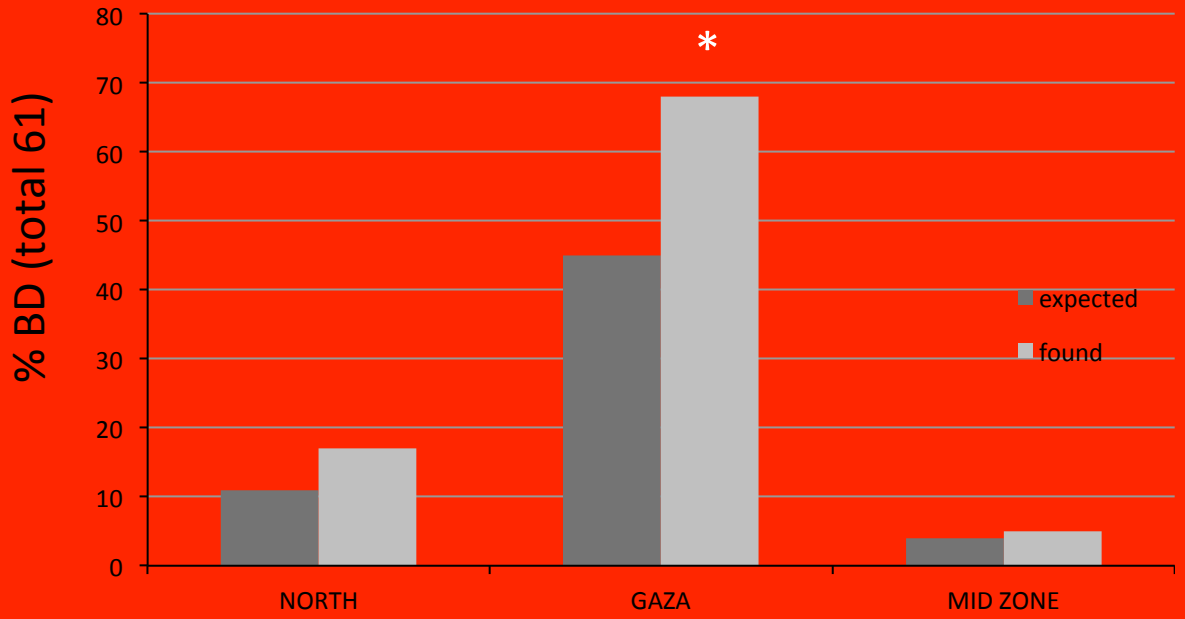
UN Mine action team, Gaza provided the data and the maps.

Different colors of the pins stay for different device identified on the ground: WHITE is WP, RED 250-100lb Bombs, other colors are mines, antithank and other ammunitions

Correspondence between parents reporting exposure and finding of weaponry on the ground of their residence was found in over 90% of the cases.



Distribution of birth defects according to residence, compared to expected, shows higher numbers in Gaza city



the numbers of BD found are compared with the expected on the basis of the newborn population in the area

One limitation of this study is the relatively small numbers of births registered (4027). An other limitation is the insufficient diagnostic, specifically for cardiac defects due to the absence of necessary instruments in the Department.

Overall outcome from the four reproductive studies

1. We established, at two years from war, the reference points for Gaza birth defects incidence at birth and prevalence in 0-2 years old children.
2. We tested, implemented and established the procedures, protocols, and the informatics for birth registers in Gaza.
3. We determined that birth defects incidence in Gaza was 1,4% in 2011, a value that might rise to 1.8-2%, if added with that of expected cardiac malformations. We thus established the condition to be able to monitor the events in next years in Gaza. In Fallujah, birth defects were only slightly increased at 2 years from attacks, but increased much after 7 years.

3. We show that birth defects are for more than half of the cases, sporadic and with no family history, unrelated to intermarriage, and, in half of the cases of recurrence in a couple they have different phenotypes, in Gaza and in Fallujah.

The sporadic pattern of presentation of BD indicates that there may be inducers in the environment. In Gaza toxicant metals were found.

The increase in time of birth defects in Fallujah is consistent with accumulation in time within the body of environmental teratogens, to a level interfering with normal gametogenesis or embryonic development. High metal load was found in Falluja adults, children and newborn.

The specific accumulation of arsenic and molybdenum in the fetuses to levels higher than the mothers, may cause developmental disturbances and the high level of U in mothers and of lead in fathers may affect gametes.

4. The majority of couples with birth defect children in Gaza were exposed during Cast Lead to bombing and/or White Phosphorus.

The correlation with WP exposure in Gaza is highly significant in comparison with couples with normal children. The correlation is proved accessing the data of the UNSCO.

Similarly, in Fallujah 73% of the couples with BD reported exposure to bombing and a about 20% also to WP, in 2004 and 2005; we lack factual control for the reported exposures.

In conclusion, we learned that a proportion of the birth defects registered could be induced by environmental contaminants associated to war events, and may occur by novel epigenetic changes.

We learned also that

The present wars that target the civilians can leave a toll of invalidity for the whole population and for future generations.

This poses unpredicted threats to the people attacked and a future impact on their health and on the countries' health system.

Conflict areas thus became the field to study **long term effects** of environmental contamination by these weapons and to investigate the mechanisms whereby they produce health damages.

One can encounter conflict of interest in doing these studies for various reasons.

Conflict areas **can also become the field to find solution for health** risks, remedies or preventive measures. Achieving this will depend from the knowledge of the facts we develop.

*The aim to **investigate in order to act**, requires that situations of damage be well known so that the effectors, manifestations, extent of the damage to the health are identified and quantified, and that research is developed for prevention/remediation, and this can be only done on the basis of the assessment of facts together with local professionals.*

The aim to confront eventual long term health problems is the task of the local institutions, so we are available to feed to those entitled the results of objective work, a fact which requires near and open interactions throughout.

Our work is motivated primarily by the whish to know in order to solve/prevent eventual damages for people's health

we are now at a cross road and is time to do more work, more consistent and more rapid work on these issue, before we risk reaching a situation of "difficult return" since also epigenetic changes can be fixed in time in the people affected.

what** can be done, **where** is necessary to do it, and **when

We wish to leave these recommendations

Monitor the incidence of birth defects and establish registers of birth in all places where the population was exposed to war.

Continue testing for metal load the newborn and parents of BD children in these circumstances, in pilot studies.

Initiate molecular studies to identify epigenetic modification in the newborn, with not invasive methods.

The answer to the eternal paralyzing question about cause-effect will come by these various approaches taken together. We are in a situation where little is know of the effect of the “cocktail of metals” we are detecting on the ground after wars and the time is precious to attain the aim of intervention to remediate, protect.

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