



The day of the Berlin explosion: The humanitarian impact of nuclear weapons

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At midday I boarded the train to Hamburg. I had waited a couple of months for this encounter and finally, Susanne Müller had agreed to meet me today and tell her story.

Ms Müller was one of the first people on site after the nuclear bomb exploded in Berlin in 2015. Back then she was working as a nurse in a Red Cross hospital but had experience in the field of disaster management. She actually boarded the first helicopter to reconnoitre the city from above immediately after the explosion, and was one of the key figures in the coordination action that followed. That Susanne was on the flight was down to pure coincidence: she was chosen because she lived right next to the helicopter landing field. When a Red Cross colleague called her that morning, she responded to her appeal without hesitation.

Three years later I was about to meet her in her new home town of Hamburg. I would be the first journalist to hear her story, and I was nervous. She hadn't been very keen to talk to me when I first approached her. In the café where we were to meet I looked around, wondering if I would recognise her. Then I noticed a friendly-looking woman of about 50 confidently waving at me from a table in the corner. I sat down with her and as we started to talk, I realised that she was just as nervous as I was.

This is the first time Susanne's account has been made public.

Interview with Susanne Müller

"In the centre there was a blank spot, clean – like the palm of your hand. Nothing was left. All traces of buildings had disappeared.

I estimated the diameter to be about two kilometres across (Exhibit 1). Around it was a red-coloured belt. The buildings in the area had all fallen down symmetrically, radiating out from the point of explosion. The trees in Tiergarten had been knocked down and fallen towards the west of the city. Two large chunks of a TV tower had crashed into the railway station at Alexanderplatz, splitting the roof in two. A huge cloud of smoke reached high into the sky. Fires were burning over an extensive area but from the helicopter, it was difficult for me to see how far they extended because of all the smoke. In a few places the fires had merged and set entire building blocks ablaze, sending tall, bright flames shooting up towards us. Houses had been damaged even further out, as far as north of the old Tempelhof airfield. But most of the city seemed to have been left intact. It was as if someone had cut out a hole out of the centre of Berlin. Now you could only recognise that part of the city from the bends in the river Spree.

The pilot told us we had to turn round because of the radiation. We all remained silent on the way back, with only the beeps of the photographer's camera accompanying the noise of the helicopter's rotor."

Potsdam HQ

"When we arrived at the situation room in the Potsdam city administration building, everyone was working frantically. All contact had been lost with Berlin. The electromagnetic pulse had destroyed all communications. Not a single representative from the responsible city authorities could be reached and we knew that many were probably dead. Yet here, at a distance of only 20 kilometres from the blast site, we still had working phone lines and electricity. In the building's largest conference room on the first floor, 20 to 30 people sat in front of their laptops as power and network cables were hastily pulled between them. I walked up to Markus, my supervisor at the Red Cross. He was on the phone talking to our national headquarters in Lichterfelde. Fortunately, the building there had been left intact and at that point, had the only working short-wave transmitter in the area. When he had finished his phone call I told him what I had seen from the helicopter."

"He was the one who had called me at six o'clock that morning to ask if I would board the helicopter, simply because I lived in the street next to the landing field. If it hadn't been for that call, I wouldn't have been there. I wouldn't have seen any of the things that I saw on that day. Sometimes I think I would be happier today if I had said no. But what are you to do in a situation like that?"

"Images of the damage were projected on a large screen at the front of the room and the perimeters of the damage zones drawn on maps, taped to the walls. I had to repeat my report in front of everyone. Seated at one end of the table, the heads of the fire department, the city council and the police spent the next two hours discussing the situation. In the meantime more people arrived. When they finally began the meeting there must have been about 60 people in the room."

"The authorities in the surrounding area are doing everything they can," began the head of the fire department, who was in overall charge. "People in the fallout area have been warned. The wind is blowing in a westerly direction, so we are okay here right now. We have no idea what is going on in Berlin, other than that there is complete chaos. We are the closest place that is operational and we're well connected to the main traffic routes. That makes us the best-placed group able to mount an organised response. There are thousands of people whose lives can be saved if we act fast. No one else will be able to provide help for at least another six hours."

The Action Plan

“The city was divided into three zones: red for “heavy damage” (HD), orange for “medium damage” (MD), yellow for “light damage” (LD) (Exhibit 2). I was to be part of a small team that would establish a first aid and triage site between the yellow and orange zones. With our basic medical supplies, we would only be treating casualties with blast and heat injuries, stabilising them for evacuation. The military were in the process of clearing evacuation routes, with decontamination areas and field hospitals being set up in Brandenburg, the area surrounding Berlin. It was clear from the rushed briefings at Potsdam HQ that neither the military nor the emergency services had the equipment and training to deal with a radiological disaster of this magnitude. The longer term response would be on a scale larger than ever seen before, it was inconceivable to me how it would be co-ordinated. Our small triage center would surely become quickly overwhelmed but our small team was determined and brave.

I could see a team of experts modelling the radioactive plume and fallout zones on the desk opposite us. It was clear that all of the first responders entering the city would be exposed to radioactive contamination, our protective equipment would hopefully minimise skin contact and inhalation of airborne particles.

We had been discussing a rough plan for just a few minutes when our protective clothing arrived. Markus was to stay at headquarters to try and maintain communications with people in the affected zones and also, and more crucially, with the media. It was of vital importance to communicate to people in the fallout zone that it was safer to remain in basements than to venture outdoors in order to escape from the area”(Exhibit 3).

“People are bound to start leaving their homes to get away as fast as they can – that’s the normal reaction. But we need to do everything we can to get our message out,” explained Markus before disappearing behind a stack of cables, monitors and phones.

“At that moment I thought about my friend Catherine and her family, who lived in Berlin Mitte, not far from the point of the explosion. They must have witnessed the bright flash just before the blast and the heat wave reached them. And even though I knew how unlikely it was, I fervently hoped that by some strange coincidence the whole family had been in the basement of their house when the nuclear bomb struck.

There were five people in the car with me: A doctor whom I had just met, a radiation protection expert equipped with a Geiger counter and two other people I didn’t know, but who introduced themselves as Anne and Max. Two radio cars followed us plus transporters loaded with basic medical equipment, and another van carrying nurses, assistants and doctors.

In Potsdam, the streets and houses looked as if little had happened. Nothing there had been destroyed. But it was still obvious that normal life had been brutally interrupted. We drove directly towards the massive mushroom cloud – a constant and horrific reminder of what had just happened to Berlin, and the difficult mission on which we were about to embark. I had never seen so many cars on the road, as everyone tried to leave the city. It was hard for our driver to pick his way through the traffic since those driving in the opposite direction were using both sides of the road.

As we got closer to the centre of town, fewer cars were coming towards us. In our car, Max kept his phone line to headquarters open to provide constant updates on where we were and what the situation looked like. I had tried to pay close attention to what I could see from the car window ever since we left headquarters, as I wanted to understand exactly how the scene changed as we approached the damage zone. Just as we had passed the big Grunewald forest, Max's telephone got cut off and the scenery altered dramatically. Suddenly, we were the only vehicles in the street. The radiation expert checked his Geiger counter: "We are about to enter the light damage zone," he informed us. It was like a cue. We all instantly started to fiddle with our protective overalls to make sure they were properly tightened."

Inside the light damage zone

"The further we drove into the zone, the more clearly we could see the havoc wrought by the blast and heat on the houses and buildings. Windows were shattered, doors blown in and the wooden bike sheds in front of the houses had collapsed. Shutters hung drunkenly from the broken windows and gutters torn from collapsed roofs were strewn across the road. And the further we went towards the centre, the worse because the extent of the damage. Since the engines in cars parked in this area were too broken to start, people were making their way on foot. An elderly man was trying to get his Mercedes to start despite the pleas of his wife to give up and walk away with her. I saw a father trying to protect the mouths of his children with surgical masks, but the little ones protested, then cried and pulled them off. At that moment it felt like a relief not to have children to worry about."

"My God," said the doctor, "I had no idea that even the 'light damage' zone would look like this". Exactly the same thought was going through my mind. I remembered what I had seen earlier from the helicopter: A blank spot that appeared to have swallowed everything.

As we drove on we witnessed how even the more solid, brick-built houses had failed to withstand the blast. Large cracks ran down their façades, some had lost an entire wall and we got a glimpse of their interiors. Getting closer to ground zero we saw that the more fragile,

wooden houses had simply crumbled, with planks and torn pieces of insulation scattered on the ground. Passing a stretch of allotments we saw that all the garden huts had collapsed, and the debris was on fire. It was surreal to think that only three days ago I had been to this area with a friend to watch a movie. As we drove past the cinema, I noticed that everything was covered with broken glass. A massive advertisement board suddenly blocked the street, and I could see an oversized, smiling man with an open shirt peering out from the shards covering his face.

The street crossed a small hill. Beyond it the buildings were heavily damaged. Almost every wall had collapsed and most of the roofs had fallen in. Our advance was slowed by increasing amounts of rubble – lamp posts torn from the pavements and debris from damaged buildings. Most obstructive, however, were cars that must have stalled at the time of the explosion. Many of them had simply crashed into each other. We reached a bus which had toppled over and crashed sideways into a line of cars. There was no way to get passed it and we chose to follow a parallel street instead.

In addition to the immobilised cars and debris we saw endless crowds of people fleeing from the disaster. Processions of the wounded tried to make their way to safer ground, some severely burned with pieces of clothing and shreds of skin hanging from their bodies. Some, in agony from the pain, held their arms in front as if they were carrying something. Those who were unharmed or had lesser wounds were carrying or dragging others. I saw entire families of injured supporting each other as they navigated across debris and broken glass.

As our convoy approached, many waved their hands in the air to get our attention. "Help us!" cried a man who was carrying his wounded young son on his shoulder. When we slowed down, more people turned towards us and headed in our direction. We could not risk getting stuck there and had been ordered not to prioritise victims who were still mobile. "Keep on walking, there is help further down the road," our driver shouted to the man carrying his son. Then he closed the window and stepped on the accelerator."

Blocked

"Eventually, we were unable to get on any further. The streets in front of us were all blocked and close by, we could see thick smoke billowing from buildings on fire. Realising that we risked getting held up by people we would not be able to help effectively, we signalled to the other vehicles behind us to turn round. We decided to set up our staging and triage site at location 14a, a sports centre next to the two closest main access routes. The radio car drove a hundred meters further up the street so that it was parked on a slight elevation, where the reception was better. A fireman broke open the front door of the sports centre and we went inside.

We were relieved to see that the hall was still structurally stable. Three windows, high up the wall, had been destroyed but the hall still offered good protection from the wind, the cold, and the radioactivity – or so at least we hoped. We began by pushing the broken glass to one side, and then unloaded the material from the trucks through a back entrance that was less visible from the street. A few injured people had already started to line up in front of the door begging for help, but for the moment we had to keep it closed.”

Setting up

“We divided the hall into three areas: triage and decontamination at the main entrance, then an area for first aid and urgent treatment and finally, a larger area for patients to lie down while waiting for help. New materials would come in through the back door and patients would be taken out that way once transport became available. Since there was a sports field next to the hall and the defunct airfield was not far away, we asked for additional materials to be transported to us by air. As all the doctors had to attend to patients, Anne and I were to head the triage team. My task was to brief our four assistants.

"We are not going to be able to help every patient. We have only one priority now, and that is to maximise the number of lives we save. Every patient with minor injuries that we send away means one more patient for whom we can make a real difference. Let me be absolutely clear. If we treat patients who can make it without us, then we are sacrificing the lives of others. That applies equally to spending time on patients who can no longer be helped. We can only hope that we are able to calm them so they will be able to die with a minimum of dignity. We cannot expect anything more. In practice that means we will focus on second-degree burns, light third-degree burns and light- to moderate lesions. Patients who are still able to walk are to be sent away, and they should only receive treatment from us if they have life-threatening injuries or if we have excess capacity available. The doors are to be barred if patients try to force their way in. Have I made myself clear?"

“We had hoped that the showers would still be working, but only a short spurt of water emerged out before they ran dry. Either the water network had been destroyed, or the electromagnetic pulse had disabled it. Therefore the decontamination procedure at the entrance to the hall remained rudimentary: Patients had to strip themselves of all outer layers of clothing and were then rubbed down with paper towels. This was to ensure that the radioactive dust did not spread and accumulate in the building – and that it did not stay on the skin where over time it could cause severe burns.

When we were ready we opened the door. There was already a crowd waiting outside, filling the entire four-lane street. It was difficult to keep them in check but somehow, we managed to regulate the influx into a continuous trickle of wounded and frightened people.

The first couple we let in was a man covered in cuts from glass splinters and bleeding hard, together with a woman who was trying to help him. He was wearing a business suit and I wondered whether they had worked in the glass building just across the street. Maybe she was his secretary. Anne, who had been in the car with me, took his uninjured arm and marked it with a '1', then asked him for his name. With an enormous effort, he finally managed to stutter what he was called."

The triage

"The triage consisted of a basic three-point system to allow us to categorise patients. 1 meant immediate treatment, 2 allowed delayed treatment. 3 indicated a low chance of survival. Lightly injured patients were turned away.

The next person to arrive was a man of about forty who had a glass splinter in his leg. My colleague asked his name and wrote it on his arm, hesitated for a moment and then wrote a "2" under the name. A small woman whom I knew was part of our team – I had seen her getting into a van earlier when we were leaving headquarters, quickly walked up to the man, took his arm and having looked at his name noted it down. Meanwhile Anne had steered the first man towards a different room where he would be seen directly by the doctors. The second man was sent to wait in another room.

A small group of people came in next and it was my turn to tend to them. I will never forget those first patients; a mother with severe burn injuries leaning on her two teenage children who were trying to carry her. During the briefing I had given my colleagues a short overview of how to differentiate between first, second and third degree burns, as well as how to assess the amount of blood loss and test basic bodily functions. Back then I was confident, even a bit impatient to start work. But suddenly I felt utterly helpless. I looked at the woman's skin and saw the blisters. This was a second degree burn. To distract the children, I asked them where they had come from. I was shocked that even here, in the LD zone, the burn injuries seemed to be so severe. We could not allow ourselves to spend more than two minutes on each patient so after I had classified the injury I had to leave them, and turn my attention to the next group of people arriving.

Although initially we were all insecure and nervous about classifying too many patients as '3', meaning that they would be refused treatment, I noticed that over time both I and my colleagues

became stricter and more adept at making a decision. The doctors and their helpers were so hopelessly overwhelmed by the number of patients that we could only let a small number through to see them, so as to give them a chance of ensuring a patient survived. It was horrific. But while we were working, there was no time to reflect on what we were doing or even to show the patients any sympathy. We had to be efficient and gradually, I found myself losing all emotional response to what I was seeing.

While we were working we didn't really talk, except to ask patients for their names and make terse demands of our colleagues when we wanted something. I still remember the shouts of "bandages! bandages!" that filled the room whenever someone with severe blood loss entered the room.

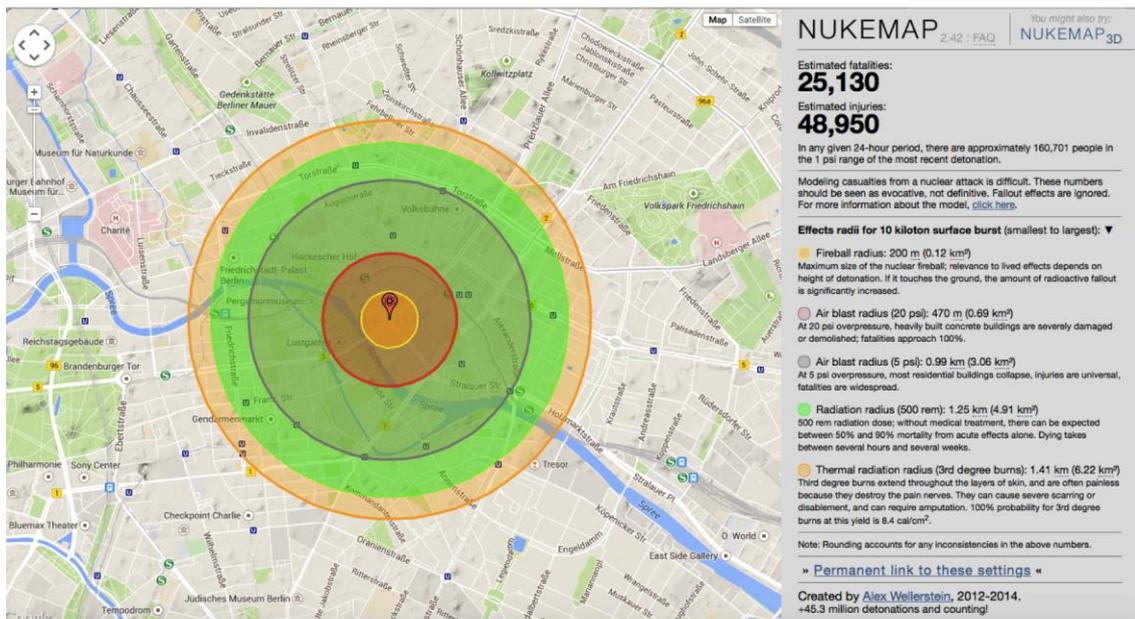
The following days were characterised by more and more work and so not surprisingly, extreme fatigue began to set in for all of us. The work situation improved somewhat when other triage centres were set up in the LD zone to offer people escaping from the MD zone refuge. We put mats on the floor in one the changing rooms and converted it to a sort of rest room for the helpers. I don't know how often I made use of that room in the end, probably not much. I was so exhausted but at the same time, adrenaline kept me going. Every time I tried to sleep for a bit I thought of all the patients waiting, and all the things I could be doing instead of sleeping.

It was later discovered that the nuclear bomb had been a terrorist attack, which explained its relatively small size and the fact that it detonated directly on the ground, not in the air. The inner city of Berlin was reduced to rubble, and there were discussions about how and when to start cleaning up the devastation, although this would be hampered by the fear of radiation."

"I live in Hamburg now. Once we had finished our triage work, I moved in with my boyfriend who owns a house here. In terms of the medical emergency, it gradually became possible to send patients to hospitals in the surrounding regions. Other doctors and nurses took responsibility for them, which of course was a huge relief. As for Berlin, my old home, I still go back to Potsdam quite regularly. I visit a close friend of mine who, like many others since the bomb exploded, has been diagnosed with leukaemia" (Exhibit 4).

Exhibit 1

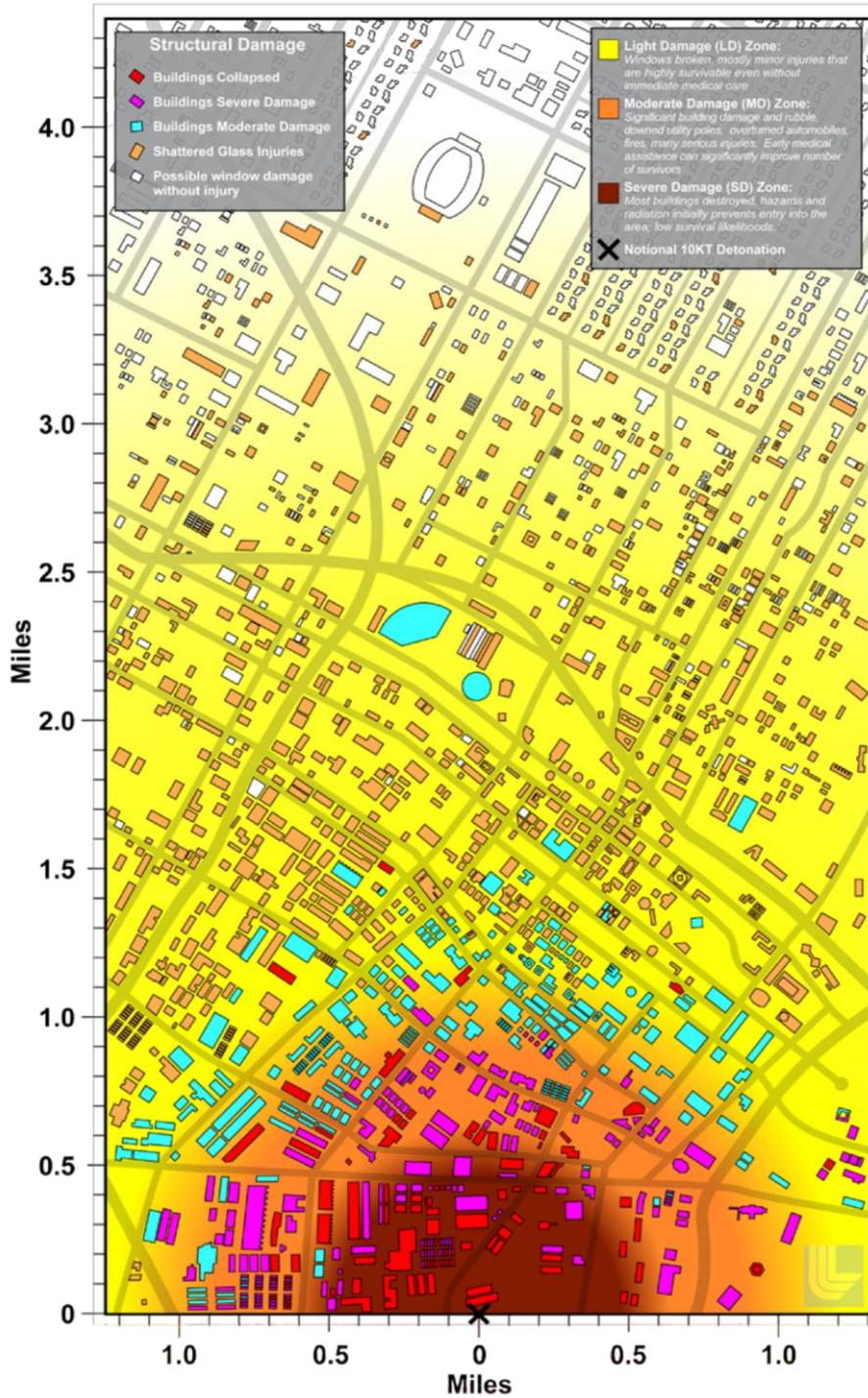
Radii of Destruction: Detonation of a 10kt nuclear bomb in the centre of Berlin



Source: <http://nuclearsecrecy.com/nukemap/>

Exhibit 2

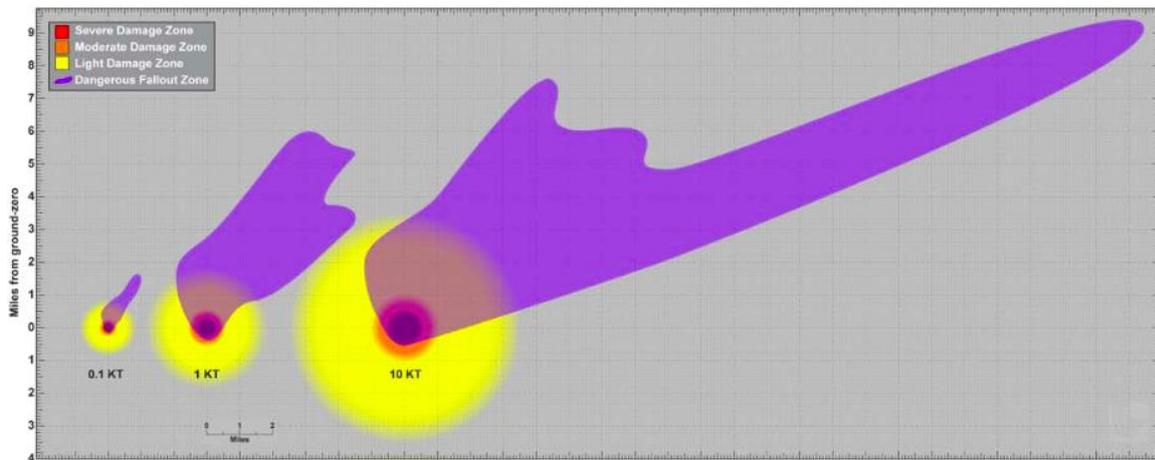
Representative damage zones for a 10 KT nuclear explosion overlaid on a notional urban environment.



Source <http://www.epa.gov/radiation/docs/er/planning-guidance-for-response-to-nuclear-detonation-2-edition-final.pdf>

Exhibit 3

Development of the fallout zones immediately after the detonation



Source: <http://www.epa.gov/radiation/docs/er/planning-guidance-for-response-to-nuclear-detonation-2-edition-final.pdf>

Exhibit 4

Long term effects: Studies of the Hiroshima survivors show a linear relationship between the received dose of radiation and the development of cancer

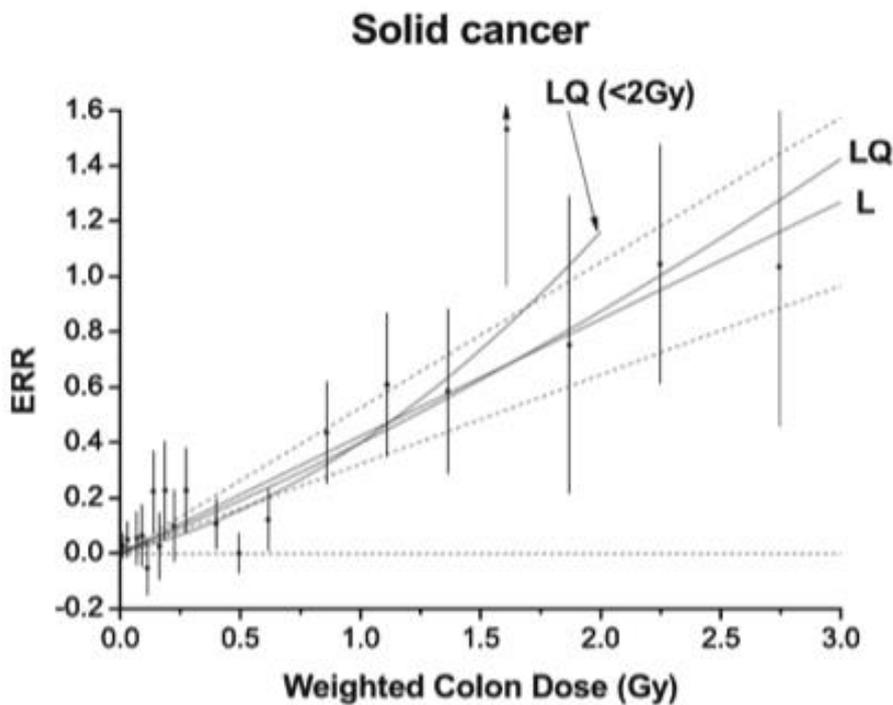


FIG. 4. Excess relative risk (ERR) for all solid cancer in relation to radiation exposure. The black circles represent ERR and 95% CI for the dose categories, together with trend estimates based on linear (L) with 95% CI (dotted lines) and linear-quadratic (LQ) models using the full dose range, and LQ model for the data restricted to dose <2 Gy.

Source: Ozasa K et al. Radiation Research 2012; 177: 229