Secondhand Smoke: the Science and The Tobacco Industry's Smokescreen

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So I want to talk about second-hand smoke, the science and the tobacco industry's smokescreen. I presented part of this to the tobacco treatment specialist group and not one of them had ridden on an aeroplane where smoking was allowed, which shows mine, but Dr. MacKay has probably ridden on an aeroplane where smoking was allowed. And if you did, this is what the venting system showed on the outside of the aeroplane. These are tar particles on the outside of the ventilation of a DC-9 aeroplane, when smoking was allowed inside the aeroplanes.

I used to smoke, and when I was smoking on aeroplane, I would always sit on the non-smoking section, because I was really annoyed by someone else's cigarette smoke. So I'd sit in the non-smoking section and as soon as the little light went off to allow smoking, I would go to the smoking section, have a couple of cigarettes and then I'd go back up and sit in the non-smoking section. It sounds crazy but that's what I did, so that's fortunately been something that's been long ago done away with in the early 1990's, we've now prohibited smoking on aeroplane since that time.

If you go back and look at how second-hand smoke and how we have begun to recognise its importance. It goes back to the early 1990's and the United States Environmental Protection Agency report, which classifies second-hand smoke as a 'Group A carcinogen'. A 'Group A carcinogen' is a chemical that is known to cause cancer in human beings, and they found that over three thousand lung cancer cases were present every year in our country in non-smokers. But more importantly probably than all that was all the other effects, asthma cases in children, bronchitis, lower respiratory infections in children, and they concluded the only way that you deal with this was to have smoke free work places, and ventilation systems and separations would not help.

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The tobacco industry though was really opposed to this and so this is from one of those secret documents that we saw in the late 1990's from, this is from Philip Morris. They were talking about EPA report as being 'the single most important challenge we currently face. It's 'will have a very direct effect on consumption. An impact that will be as great, if not greater than excise tax increases.' So the two things that the tobacco company hate more than all the rest, are increased prices, taxes, and smoke free work places. Those two public health policies do three things. They reduce consumption in people who continue to smoke on an average of three to five cigarettes a day or less, they increase the chances of a person stopping smoking, and they decrease the chances of your child or your grandchild to ever start smoking, and that's why they fight these policies so much.

So these are some of the Group A carcinogen's, arsenic, asbestos, benzene, radon, vinyl chloride, and second-hand smoke is probably the more important one of all of these. It causes more death and disability worldwide than all the rest of them put together. So what's so bad about smoke? Tobacco smoke contains all kinds of things, arsenic, benzene which are listed as Group A carcinogen all by themselves, chromium 6, formaldehyde, you all know what formaldehyde is, it's embalming fluid. So if you want to get a head start on the undertaker, just start smoking and inhaling tobacco smoke and you'll get your formaldehyde. There's lead, there's nitrosamines, there's vinyl chloride, there's radioactive substances like polonium 210, remember polonium 210? Does anyone remember what that was about? Anyone remember what polonium 210 was, just a few years ago? Oh come on, the Russian spy? Oh yeah.

[04:10]

So at the bottom is an article we wrote based on the internal documents, that was published in the American Journal of Public Health, two years ago, on what the industry knew about polonium. What they did about it? And what they found out is that they had, polonium was in their products, it could not be removed, and when the scientist went to report that to the literature, their lawyer said, no way will you report that. We cannot let that sort of information get outside of the company. So here he is now a few weeks later, dying from polonium toxicity and radiation poisoning. I told the group, so if you look at a period in one of the sentences, anything you have in front of you, that is the size of polonium required to kill a person. It's very toxic, and it's presence in all tobacco smoke and it cannot be removed.

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So, one of the very early articles about second-hand smoke causing lung cancer in non-smokers was from Dr Hirayama. And this is from his non-smoking wives study, and the bar over on this side shows women who were non-smokers and married to non-smoking husbands. The middle bar is women who were non-smokers, married to smoking husbands, and then the green bar is women who were smokers. So the risk of lung cancer is, there's a dose response so there obviously was exposure of the women over here on this side, but this wasn't so much at home. And then if they were married to a man who smoked, the risk of lung cancer was over twice that. And Dr Hirayama, was a renowned epidemiologist from Japan, who was world known, and highly esteemed, but the tobacco companies didn't like this. So what they said was, here's what's now being said about tobacco smoke in the air, 'before you believe half the story get the whole story.'

They put these advertisements out in newspapers all across the world, to discredit Dr Hirayama who was a good scientist. That's what they were saying in public, but in private in their own documents they were saying a whole different story. They had a debate within their company, and the debate went like this. There was a man by the name of Dr Adlkofer who was a German scientist within the tobacco companies, had committed himself that Lee and Hirayama are correct, and tell the tobacco institute are wrong, so they had this discussion inside, their own side had said that Hirayama was right. They believe Hirayama's a good

scientist, and that his non-smoking wives publication is correct, but publically they were trying to discredit Dr Hirayama. And he replied with a strong statement, that Hirayama's correct, and that the tobacco institute knew it and that the tobacco institute published its statement about Hirayama knowing that the work was correct. So the dichotomy again, what they say internally, and what they say publically is just one hundred and eighty degrees off.

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Well I had the good fortune of meeting Dr Hirayama, at the world conference in Paris, at the La Défense, the new La Défense, they had a thing out there, they had a thumb in the background, so we got out there and I'm back in the back over here. Now this was twenty years ago, people do age a little bit, and so Dr Hirayama is in the front and we all have our thumbs up, and Judith Mackay, is quoted as saying that, he is the grandfather of epidemiology in Asia. He was a great man, and he had really some great science, but the tobacco industry uses all their tactics to attack people like that and I'm sure Judith has experienced a lot of that and all of us that have been involved for very long have experienced some of their wrath.

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Go forward in time, just a couple, three years ago, on another study, also in women who were non-smokers. This is a prospective study, large study from China, showing that second-hand smoke exposure causes serious problems. So if you go to the bottom line, here, and it really confirms what Dr Hirayama said over twenty years before that. That the risk of lung cancer in non-smoking women was extraordinary, the odds ratio was up to 1.79 increase risk of lung cancer mortality in women who are exposed to second-hand smoke. So this is real, and the tobacco industry would have you believe otherwise, but it absolutely is real.

Well, what about some of the other science, how about the asthma relationship? This is a study, which took not only parental report of second-hand smoke exposure at home, but also measured cotinine. Cotinine is a metabolic product of nicotine, so it's a good measure of exposure to tobacco smoke, and what they found was that where there was no report of second-hand smoke exposure at home, that the urine cotinine was low 5.6. If mother smoked or other persons who smoked at home, the rate was twice that, but if mother and other person smoked then the rate was 55 nanograms per mL of cotinine, which is an extraordinary high level, but the more important part is that exposure increased the risk of having asthma exacerbation.

So we teach our medical students in paediatric and family medicine residents, if you have a child in front of you that has recurring asthma, then you need to treat that, but you also need to be asking the question, is anyone smoking around this child? Because if they are, then you can treat as long as you want to but you're not going to get very good results until you have a smoke free environment. This shows the cotinine concentrations and for no exposure for mother or others who smoke, and mother and others who smoke, showing the high concentration. I could show you the same graph with the exacerbations of asthma going up over time.

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Well if you're not concerned about your children's asthma then worry about your own aorta. This is a study from Greece, where men were being evaluated for chest pain, and had cardiac catheterization. They did not have myocardial infarction, but they had chest pain enough to warrant this. And they put a catheter in the aorta to measure the pressure across the aorta, and then they were allowed to either smoke a cigarette, which I find we couldn't get that through our human studies committee right now, or five minutes of second-hand smoke exposure, five minutes. Five minutes of exposure, and then sham smoking, which would be basically puffing on a straw, and what they showed was, was that it was a very abrupt reduction in the distensibility of the aorta, by 20%, with exposure to five minutes of second-hand smoke. And with 27% was smoking a whole cigarette. So there's a non-linear dose response when it comes to the endothelia function with exposure to tobacco smoke. So it's a very exaggerated, very real phenomenon. And this represents endothelia dysfunction, which is the precursor to the development to cornea artery disease or arthrosclerosis. This is the catheter they used to measure the pressure across the aorta, so it was a fairly sophisticated number of experiments that showed a very abrupt reduction in distensibility with only five minutes of exposure.

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How many of you in this room, in the last month, have had five minutes of exposure to second-hand smoke, raise your hand. I'm surprised it's not more than that, because that's not a very long time. Not a very long time. Well if you don't worry about your aorta, how about worrying about your coronary arteries, because there are direct effects on the endothelium in the coronaries as well. And this experiment measured the coronary velocity reserved by using transthoracic doppler echocardiography. And there was thirty minutes of exposure to second-hand smoke in this group, and with thirty minutes of exposure there was an abrupt reduction in the coronary flow velocity reserve to equal that of a smoker. And this is what it looks like graphically, so over here on this side, up above is a non-smoker. Down below is the smoker, and then with thirty minutes of exposure the coronary velocity reserve is identical. Again endothelium dysfunction is the precursor to coronary artery disease and arthrosclerosis, and this is endothelium dysfunction with only thirty minutes of exposure.

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So, back in the early part of last decade, on the top there was a study that came out of Helena, Montana. Where they implanted a smoke free workplace policy and notice an abrupt reduction in admissions from myocardial infarction. And most of us can scratched our heads at that time and said, well is this really true or not and the reality is, it is true. Because the other studies I'm showing on this slide shows basically the same thing. When smoke free work place policies where put in place in communities or even in countries like in Ireland and in Scotland, there has been reduction for admissions for acute myocardial infarctions. And the one on the bottom shows the reduction of almost 47% reduction and admissions in the three years after the ordinance was passed. It was a very dramatic occurrence.

This is from the Colorado study, which is on the left show Pueblo City. The green bar is before the ordinance went into place, and the black bar is after the ordinance went into place. And the other two counties are places where there's no ordinance put into place, it's the same time and there was no change for admissions for acute myocardial infarctions in them. The only change was in the one in Pueblo City. How can that be? How can you have such a reduction in acute myocardial infarctions was something so simple as having smoke free work places. Well, many people had pre-existing coronary disease and they didn't even know it. Most coronary artery disease is asymptomatic. Second-hand smoke has a very direct affect on platelet adhesiveness, causing the platelet to become sticky. I've already told you about the endothelial dysfunction in the coronary velocity reserve.

So when I have patients who have coronary artery disease I tell them, 'you should have no exposure, zero exposure to second-hand smoke, because it will be too dangerous for you to do that.' And the evidence is pretty clear.

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Well we are going to go over to Macau on Friday, and we're talk about this is thing, because people think that you can have ventilation systems that will evacuate the smoke from an interior workplace. That's just not true. Smoke particles are so energised, if someone would like up a cigarette over at this corner of this room right now, within just a few seconds you can smell it over there. Smoke particles are highly energised particles, and they travel so rapidly that in order to evacuate a room this size with ventilation systems, the ventilation system would have to have the sucking power of a tornado, cyclone in order for it to evacuate the room. So there's no way the ventilation systems will do that, so this kind of shows that.

So they had non-smokers going to casinos, and they had to be in the casino for at least four hours, they did a urine test before and a urine test after, and what they tested for, was cotinine, a metabolic product of nicotine. And they also tested for NNAL, which is a metabolised NNK, which are two of the most potent carcinogens that are present in tobacco smoke. And what they found was, four hours of exposure in these well ventilated casinos, there was detectable not only cotinine, but highly significant detectable NNAL. So you might say, how does that stuff get into, when you inhale it into your lungs, how does it get into your urine? Well it does it is when you inhale it into your lungs, it's absorbed into your body, it gets metabolised and then it gets excreted in the urine. And that's how it ends up. That's why people who are smokers have higher rates of kidney cancer, urethra cancer, and bladder cancer, because these chemicals are excreted in the urine.

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So, let's spend just a couple of minutes on the tobacco industry, because the tobacco industry fights all of these things every step along the way. They are literally everywhere and that's not because I'm a panel, but they really are. And they have fought this all along. They have had a global consultant programme, which was intended to and has influenced public opinion, about second-hand smoke. And it was run by US lawyers because they're the ones that had the expertise both in the science and in public affairs, because these people, these consultants

where hired for public relations reasons, to convince the public that there was something wrong with the thought that second-hand smoke kill people. They wrote articles, books, would make presentations that legislative bodies, they testified before councils in parliaments, lobby political figures and so on, this is what they've done so this programme begin in the 1980's and it's still going on today.

The Asian Pacific region was targeted in the late 1980's and Hong Kong was right there with the rest of them. Latin America was also targeted and they're still doing this all today. But in Hong Kong, this was a listing of the consultants from Hong Kong that were paid consultants to the tobacco industry in the 1980's and the 1990's. Now I don't know any of these people, maybe some of you do, you recognise some names? Which is really, it's almost shocking sometimes. In Argentina, there was a cardiologist who was head of the cardiology institute in Argentina that was happened to be a friend of President Menem at the time when they had a law passed in their parliament to pass smoke free work places, and they hired him, Dr Alvarez to lobby President Menem, to detail the law and he did, and Dr Alvarez got tens of thousands of dollars for doing that, because the documents show him and the budgets that supported that.

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But in Hong Kong it was these people, and this is from Covington & Burling, which is one of the law firm's that was running the consultants programme, so they talk about how these things work, 'give our consultants prestigious, useful work to do, support the setting of reasonable priorities in the countries in which they work is conducted.' And that needs, you had to brief government officials and journals in particular.' And in Hong Kong there was a breakfast meeting with Linda Koo, Sarah Liao, and continue with the two of them, and then they had a luncheon briefing organised and hosted by this Doctor with the environmental protection department officials. So this is how this works. They hire people who have credibility within their own community to go lobby on their behalf, and telling that the tobacco industry wants to be told which is to create doubt about the health implications, without having to deny. That's from their own words, creating doubt about the health implications without actually deny.

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So here's another one, this is about the same person; her firm has now been selected in the finalist for the Hong Kong air quality study. And they thought that was really good, because that's precisely the sort of results that the consultant programme is designed to achieve. Underscoring yet again the desirability of getting the programme back on track, they spend millions of dollars on this every year. In South Asia they spend hundreds of millions of dollars on this programme across the entire globe.

This is a whole report, written by Philip Morris, you can see at the bottom, and in the report, they talk about one of their other consultants, Dr Koo, reported that diet, independent exposure to ETS appears to be associated with relative high incidents of lung cancer among

non-smoking Chinese women in Hong Kong. And I don't know how diet has a lot to do with this, maybe it does, but frankly I don't believe it.

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And she reported the vegetables, meats, fish that are salted cured or pickled are associated with increased lung cancer risks, while fresh versions of these foods are not. I haven't read her work and I don't know her. Do you all know her? Pardon, she left Hong Kong, so she probably left much more wealthy than when she was here. So in her work she said there's no significant association between second-hand smoke and lung cancer, and that was her conclusion. And I'm sure in her publication she declared that she had a conflict of interest because she was a paid consultant for the tobacco company if that was in all of her articles, I'm sure that was there.

So just to round up, the 2006 Surgeon General Report in our country reported several key findings. One is we're making progress, the detectable cotinine concentrations are going down a lot. They reiterated that second-hand smoking causes premature death in children and adults. The association with SIDS, the upper respiratory infections, ear infections, severe asthma in exposed children are known. The one thing that they report on this time that wasn't in the previous report was the immediate and advert cardiovascular effects with exposure for adults, heart disease and lung cancer have been known before. And the other conclusion is this middle one that there is no lower limit of exposure that is free of risk. There is no other environmental toxin that you can say that about. And again eliminate smoking in doors protects non-smokers but ventilation, separation will not.

Tobacco industry will have you believe that this is a matter of choice and accommodation. We need to have, people need to choose whether or not they want to smoke, business should choose whether or not they have smoke free places, and we have to accommodate smokers and non-smokers in the same space, that's just pure idiocy because smoke obeys all the laws of physics. And our Judge Kessler in the Department of Justice case, really summed it up quite well. This is a case that has now been under appeal and has been upheld at the court of appeal's level, it will probably go to the Supreme Court. And she says, 'Public promises were intended to deceive the American public into believing,' and you can put any public in there it wasn't just the American public, 'believing that there was no risk associated with passive smoking and that the Defendants,' the tobacco companies, 'would fund objective research to find definitive answers. Instead, over the decades that followed, Defendants took steps to undermine independent research, to fund research designed and controlled to generate industry favourable results, and to suppress adverse research results.' Such as polonium, and other things like that.

So, to summarise second-hand smoke clearly is a serious health problem, it is something that we need to do more about, and we will always have to face the tobacco companies because they will resist any efforts to make our environment smoke free. Thank you very much.