Plastic Health Summit – Amsterdam, October 3rd, 2019

The very first forum focusing on the impact plastic has on human health was organised by Plastic Soup Foundation and Parley for the Ocean, in cooperation with the Plastic Health coalition and the Dutch financier of health research ZONMW.

Short video summary: https://www.youtube.com/watch?v=5VG3v3I6bos

PLENARY OPENING

On an introduction speech, Maria Westerbos declared that Plastic is a danger to humanity while Cyrill Gutsch, founder and CEO of Parley, stated that Plastic is a design failure representing the perfect illustration of our toxic age far from the revolutionary material that have been communicated to us. For both, plastic needs to go, and we must open the next door to a world without plastic. For them, plastic represents the same scandal that we faced with the tobacco industry. The plastic industry is using the same marketing techniques to hide the toxicity of their products and captivate consumers.

We need a new strategy to the 3R→ Parley promotes the AIR strategy: Avoid, Intercept and Redesign.

Dick Vethaak, a professor of Ecotoxicology at Vrije Amsterdam University, then explained that current science is not able to study the smallest plastic particles yet. But we already know that everybody has chemical and plastic additives in their blood. These additives can be toxic even at very low concentration.

He explained that plastics monomers are petroleum based, chemical additives are added to give the plastic certain specificities. We are exposed to both.

The plastic soup and microplastics topics only came up like a decade ago.

This plastic threat does not represent only one pollutant but a cocktail of contaminants.

The smaller the particle the easier it can enter your body. They can embarrass your immune system, damage your DNA. No hard evidence on humans is available yet but examples can be found from rats and fish.

About 3 to 7% of the fine particles in the air come from rubber tire dusts.
Particles can contribute to the total load of chemicals in the body. Particles could contribute to cancer. They could deliver toxins to the brain or the placenta. These potential chemical effects require urgent research.

Microbio effects were discovered a couple of years ago. Micro ecosystem, biofilm, that contain dangerous bacteria. Some of these thrives much better on plastic. Plastic can then disperse the pathogen and can increase the infection rate. So, the conditions you can see in some rivers all around the world where you have low hygiene conditions, combined with high contamination of plastic in the water, make the context even worse that it would appear.

There is still a lack of knowledge and gaps in learnings which require urgent research.

How much do microplastics enter our body? Where do they accumulate? How do they interact with our system?

Recorded interventions:
- Maria Westerbos
- Cyrill Gutsch
- Dick Vethaak

SCIENCE TALKS ON MICROPLASTICS BY ZONMW

Earlier this year, ZonMw made €1.6 million available for fifteen short-term scientific studies. The most pressing, but never previously investigated, questions were aimed to be answered by these studies. Some of the preliminary results were presented during this session.

1) **Stephanie Wright**, research associate at the department of Analytical, Environmental & Forensic Sciences at King's College London

What are the most important research questions for microplastics and health?

This is a holistic issue. J. Jembeck estimated that in 2010 between 4.8 and 12 million tonnes of plastic were leaking into the ocean. But this only represents one part of the mismanaged waste. The rest is leaking on land.

It is already known that particles cause heart disease, stroke, lung cancer, chronic lung and respiratory infections. How does the microplastic count in this particles' danger?

Some industries are exposed to really high level of microplastics specifically via the air. Flock workers for example that are highly exposed to nylon particles, typically have breathing issue and can go up to irreversible effects. → https://en.wikipedia.org/wiki/Flock_worker%27s_lung

Rats exposed to Nylon particles suffered from inflammation. They got back to normal after 25 days with no exposition. So there is hope.

PE and PP dusts expose to the same type of effects. But is it a plastic issue?

What is the role of shape? We are exposed to various types of shapes. Fibres do not interact in the same way as pellets do for example.

What is the relative contribution of plastic particles compared to other particles? How does the path of chemicals via microplastic affect us compare to other paths?

Recorded intervention: https://www.youtube.com/watch?v=mE_gh9nmTGU

2) **Ingeboorg Kooter**, senior project leader of Toxicology at TNO Circulate Economy and Environment.

The effects of exposure to microplastics and lack of adequate methods to detect plastics.

Development of new measurement technique is needed.

Need to quantify the exposure part. What are we exposed to? In what quantity? What do we take into our body?

There is no quick and easy detection method, no standardisation in sampling and analysis of the plastic particles, and plastic particles are not one compound but a complex mixture of different types of polymers, shapes and chemicals.

We breathe millions of particles in each breath we take.

Our body is exposed to intrusion through the air we breathe, through our skin, and through the food we eat. The smaller the particles are the higher the intake can be.

- Our skin has a heavy protection barrier against particles. No proof today of exposure via the skin.
- Inhalation route is important. Especially in the textile industry, millions of plastic particles have been found in workers. We are really exposed through textiles. Mainly through an indoor context (at home for example) so it is important to ventilate.
  Outdoor most of the microplastics particles we are exposed to are tyre particles, but they only represent 2% of the particles we inhale at a traffic light for example.
- Ingestion is the main route of entry for microplastics: via water and food. 1 to 2% seem to pass the intestine barrier.

Tno.nl/tno-insights

Recorded intervention: https://www.youtube.com/watch?v=CeNG7qoXa2w

3) **Fransien Van Dijk** – postdoctoral researcher at the University of Groningen Molecular Pharmacology Department

Impact of textile microfibers on our lungs?

Clothing textiles release micro fibres during the whole life cycle: production, usage, and end of life. These fibres are mostly plastics.

Fibres are abundant in the air we breathe.

20kg/year of dust accumulation in our house, 6kg being plastics.

Miro fibres have been found in human lungs tissue. Reports in nylon flocking industry shown that these fibres can be harmful and can have an effect on our lung cells.

Smaller particles, from diesel for example, can reach all the way to the alveoli of the lung and cause damage there.

Fansien is studying the effect of microplastic fibres (Nylon and Polyester) on lung cells. Lung cells strongly response to the presence of micro fibres. She finds that Nylon fibres have a strong impact on mini lungs while PE have lesser effects.

We do not know the current concentration we are exposed to. The concentration in our daily life is certainly much lower than the concentration she tested so far. However, we can clearly see that there is an effect. So, we urgently need more research. Important to test the current fibres we are exposed to in real life and test them on human tissue. For her study fibres and tissue were all laboratory created.

Recorded intervention: https://www.youtube.com/watch?v=s3JXJxyUD0w

4) **Juliette Legler,** professor of Toxicology and head of the Toxicology division at Utrecht University's Institute for Risk Assessment Sciences (IRAS9

Microplastic in the human foetal environment

In the uterus the foetus is extremely sensitive to exposure to chemicals. They can cause development issues to the foetus and play a role in disease development later in life.

We do not know yet if microplastic reach human foetus and placenta. But we know that other air pollution particles were found in mothers' placenta.

And from research on animals, we know that plastic particles made it to the placenta and the foetus' brains and liver after injecting some microplastics in some animals' blood.

Sher and her colleagues started the study 4 months ago. They are currently collecting human placenta cells and amniotic liquids, selecting the most relevant plastic particles that we are exposed to on our daily life in order to work on the detection of plastic particles on placenta and amniotic fluid, and also expose particles to placenta cells and amniotic fluid.

They have a year to study the exposure and the hazardous effects.

Recorded intervention: https://www.youtube.com/watch?v=QfVFa4N-reU

5) **Heather Leslie**, research associate at the faculty of Science, Environmental Chemistry and Toxicology at the Vrije Amsterdam University.

Possibility of plastic particles in our blood

During previous studies they found microplastics in all food items that they looked at: beer, wine, honey, mussels, oysters...

They are now working on boosting the collaboration between laboratories and the comparability of data.

Lots of research detected microplastics in the blood of animals and could follow them all the way up to their organs. So, we soon should be able to detect them in human blood and organs. Publication should come very soon.

An absence of evidence is not the same thing as an evidence of absence.

What to do in the meantime? Apply the precautionary principle. False alarms have been really rare in scientific history.

Recorded intervention: https://www.youtube.com/watch?v=czQdr8BXqFY

6) **Ana Maria de Roda Husman**, head of the Environment Department of the Centre for Infectious Disease Control at the National Institute for Public Health and the Environment (RIVM).

How microplastics could be a vector for harmful micro-organisms

Only 20% of all our wastewater around the world is treated. Bacteria and pathogen are in the wastewater and could use microplastics to grow, travel and spread.

Pathogens and antimicrobial resistant gens have already been found on microplastics.

Recorded intervention: https://www.youtube.com/watch?v=cgGgplDUfQw

7) **Nienke Vrisekoop**, assistant professor at the Respiratory Medicine department at UMC Utrecht's Center of Translational Immunology.

How immune cells deal with microplastics?

The role of our immune systems is to attack bacteria that tries to enter our system.

With studies on mice they could see that through ingestion of microplastics, some particles entered the liver, kidney and gut. It was the case even with particles bigger than our cells.

In her research, they isolated human blood cells and exposed them to 4 types of microplastics and 2 sizes (same size as cells and smaller). They tested clean microplastics, and microplastics with blood cell protein on it. The dirty big microplastics were attacking and killing the immune cells. The smaller microplastics attacked but did not kill the cells.

If a microplastic is clean it is ignored by immune cells but if microplastics have blood protein on it, it is recognised by immune cells and can kill them.

These studies are only 4 months old. Now they want to test different shapes.

Recorded intervention: https://www.youtube.com/watch?v=b-8DZ2taGPA

SCIENCE TALKS ON ADDITIVES

This second round of talks was organised by Plastic Soup Foundation and addresses the health effects of additives commonly used in plastic, both in terms of the development of long-term and chronic disease in adults.

8) **Pete Myers**, chair, founder, and chief scientist of Environmental Health Sciences

How plastic harms the health of future generations through intergenerational endocrine disruption

Plastics and human health: we know enough to be concerned. We must redesign plastic, and this is especially true for the chemicals Pete is working on.

For example, it is known that exposure to bisphenol A increases the risk of preeclampsia. But how do we prove it on a particular case. He took the example of his daughter who was exposed to the big Californian fire that destroyed the city of Paradise. Her granddaughter was born premature because of her mother preeclampsia. As a scientist he directly thought about the chance that the reason could be the toxicity of the fumes his daughter was exposed to during several weeks, but which was difficult to prove.

The potential health consequences are hormone related cancers, obesity, infertility, heart diseases, autism, diabetes, autoimmunity…

What makes plastic toxic?

- the monomer itself (BPA and other bisphenols)
- the additives (almost all plastics have)
- the non-intentionally added substances (NIAS is an example, but we do not know about most of these substances)
- the chemicals absorbed by the plastica

What should be considered low doses? Shouldn't we represent it in terms of the number of molecules to make it clearer?

For Pete, low doses can matter a lot. For example, in the case of hormone disruptive chemicals many things happen at low doses.

Today science is facing a painful reality:

- No plastic has been tested thoroughly
- The test used are flawed and outdated
- Core assumptions are wrong (low vs high doses for ex)
- Some analyses were manipulated to hide the real problems (the BPA industry revenues represents 1bn$/hour)

Serious science shows transgenerational impact of chemical exposure. It means that an exposed grandmother can impact her great great children.

Chemicals provokes changes in how the DNA is controlled.

¾ of plastics are toxic including bioplastics.

For Pete the new 3 Rs should be: redesign, reform (regulatory science as it is practiced today), recharge advocacy.

Recorded intervention: https://www.youtube.com/watch?v=OifnPOAolLw

9) **David Johns,** CEO and founder of "Just one ocean"

Plastic in our water. Should I be surprised or worried?

In his view the recent announcement made by the World Health Organisation do not say there is no risk coming from microplastics in the water. It says that there is not enough knowledge to say that there is. So, there is a high need for further research.

Recorded intervention: https://www.youtube.com/watch?v=M7nQHZ0BUG4

10) **Susan D Shaw,** Environmental Health scientist and founder, and president of the Shaw Institute.

Fire fighters are the "canaries in the coalmine" who reveal the harm plastic additives have on our bodies

Recently discovered "pyroplastic" are PE and PP that were transformed by fire and became rock like. Where do they come from remains a mystery? We only know that they have appeared in the last 70 years.

Plastic is closely linked to the climate crisis we are in today.

Susan did dive in the oil spill caused by BP oil in the Gulf of Mexico in 2010. She was surprised to see that petroleum is toxic to every organism. There is no safe level of exposure. BP was allowed to really lie about the oil spill. Millions of people got sick.

Does plastic make us sick? Firefighters are getting more and more cancers with short latency (5years). Plastics in furniture foam, mattresses, TVs, computers, electronics, insulation, plasticizers, additives, flame retardants make today's fire more toxic. Cancer is the highest cause of death to fire fighters today.

Studies showed high level of carcinogens in blood after firefighting. The heat increases the absorption of chemicals.

Smokes remain toxic long after the fire and from ash.

Now when we see the annual fires getting bigger and bigger it's quite scary given the toxicity of the smoke. Moreover 41% of the world's garbage is open burnt which creates the same risks. Some people are using plastics for cooking.

Toxic nightmares: WHO estimated that exposure to these toxic fumes increases cancer risk by 90%. Other consequences are DNA breaks, mutations. We need to move on from the fossil fuel economy.

Recorded intervention: https://www.youtube.com/watch?v=DktdVr3MTic

11) **Jane Muncke**, toxicologist, managing director, and chief scientific officer at the Food Packaging Forum

How plastic chemicals can seep into food from food packaging? Some of the chemicals are known but many are not.

In the 1980's already, the first scientists stated that plastic was accumulating in the environment and killing species. In the meantime, there were several failures in lab experiments with compromised tests because of the leakage of chemicals coming from the plastic tubes they were using.

Chemicals are biologically active.

One of the chemicals mainly known for its risk is BPA and we see increasing marketing around BPA free products**.** Today, there are 63 known hazardous chemicals, dangerous for human health, that are still used in the food packaging.

One bottle contains 100s even 1000s of chemicals. 90% we don't even know what they are mainly because they are non-intentionally added substances. All substances have a reaction that produces new chemicals.

Today there is still a lack of knowledge on which chemicals humans are exposed to from plastic food packaging and what are their impacts on human health.

However, it is not acceptable that governments and regulators accepted in the last decades and still accepts today that food packaging with unknown chemicals are put on the market.

Recorded intervention: https://www.youtube.com/watch?v=qI36K_T7M2Q

12) **Laura Vandenberg,** associate professor and graduate program director at the University of Massachusetts.

How early life exposure to chemicals and chemical mixture can predispose individuals to diseases that manifest later in life

Humans are exposed to chemicals from numerous sources, including plastics.

All children are born pre-polluted.

Some of these chemicals have hormonal activity while at every stage of life our bodies depend on hormones.

Hormone associated diseases disorders are on the rise. Periods come more and more early. There is an increase in testicular cancer, a decrease in sperm production. Neurological diseases have also increased, the obesity rate as well.

All these changes occurred over a short timeframe.

BPA is just the tip of the bisphenol iceberg

The good news is that changing products can reduce exposures level really quickly.

Recorded intervention: https://www.youtube.com/watch?v=okfB6zXsAxA

13) **Heather Leslie,** research associate at the faculty of Science, Environmental Chemistry and Toxicology at the Vrije Amsterdam University.

Extent of our everyday contact with plastics

Consumer products are a strong source of plastic additives.

Heather is looking at the additives and the particles that contain the additives.

In 2014 she studied some cosmetics. She found out that one anti-wrinkle was composed of thousands of PE beads. Some shower gels and exfoliating products had a 10% composed of PE.

Many people don't know that the lining of single use paper coffee cup contains LDPE lining.

Several examples of toys are found to contain quite high levels of flame retardant probably coming from the recycling process. Black plastics are often suspicious because they are usually recycled plastics.

Recorded intervention: https://www.youtube.com/watch?v=jGvfz0Ero0A

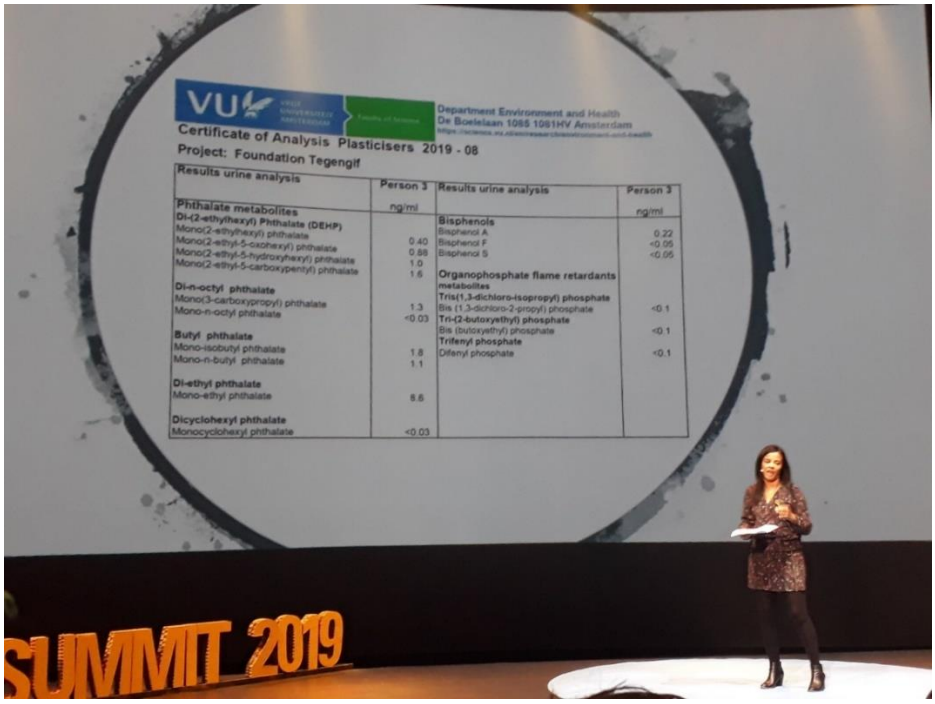
BREAKOUT SESSION: INFLUENCERS

This session was led by speakers who have turned words into deeds and by doing so, have inspired audiences across the world to take action against our excessive use of plastic.

14) **Liz Bonnin**, biochemist, wildlife biologist and BBC science presenter

How to communicate about this dramatic issue?

She just received her results from a urine test where they found several types of phthalates, bisphenols and flame retardants molecules. They are present at low concentration, but these chemicals are known to have impact at low concentration.



For her, the main source of exposure is from our diet.
Phthalates are found in PVC. PVC is used to produce films, in the tubes used in the industry (milk industry for instance), in the gloves used by the manufacturing industry…

She really wants to use these results to show that we are at the tipping point that needs real changes at industry level and policy level.

She also wants to push the message that more funding is needed in research.

Let's talk about it until everybody knows it.

Recorded intervention: https://www.youtube.com/watch?v=mkRRHMxSPJg

15) **Sharon Lerner**, environmental journalist for The Intercet.com and reporting fellow at Type Investigations

The power of the plastic industry through lobbying, greenwashing, and misleading governments and consumers with sustainable facades.

Being based in the US she preferred to send a video instead of taking a plane: https://theintercept.com/2019/10/03/plastics-industry-plastic-pollution/

Sharon starts explaining that in 1967, there were 25 million tons of plastic produced. These days, there is 300 million and almost half of what we are producing is single-use plastics.

People are getting more and more upset on the impact of the pollution and health issue it is causing. Why haven't we gotten further with eradicating plastic? For Sharon, the answer is "follow the money".

Jan Dell, former corporate sustainability consultant and founder of The Last Beach Cleanup, testifies that the Orange County where she lives in is pretty clean because they have ordinances that really stopped pollution : California fee on bags, container deposit law, California straw on-request law.

What shocked Jan when she started working on this area was that many communities and states did not have the legal right to pass a bag ordinance and reduce litter, but they were required to clean them up and pay for it. In fact, corporate lobbyists had gone in at the state level and pass a law that prevented them from putting fees on bag.

Sharon then gives example of a plastic collection kids contest sponsored by the organisation A Bag's Life which is a project of the American Progressive Bag Alliance which fight aggressively against bag bans. For her, it encapsulated the double-edged strategy we've been seeing from the plastic industry for decades. On one hand they say "Recycle. We are with you. Let's do it. Keep everything clean". On the other hand, they are fighting every serious attempt to limit plastic production.

Finis Dunaway, Author of "Seeing green: the use and abuse of environmental images", then speaks about the recycling symbol. He considers it to be the most recognizable image of environmental hope. It was created by a student in 1970 during a contest organised by the Container Corporation of America. It's an icon that tells consumer that we can keep consuming products, resources, and that the cycle will continue to create a kind of ecological balance between production and consumption.

Then Finis talks about "the crying Indian" commercial that was created by Keep America Beautiful, an anti-litter organisation founded in 1953 by beverage and container corporations. Pushing consumers to focus on individual responsibility in fighting the litter menace creating guilt among them.

Sharon adds saying that is how "Recycle" was the key message from environmentalists for a long time, reducing the importance of the "Reduce and Reuse" messages. But in the decades that recycling has been emphasized in the US they have never gotten even up to 10% recycling rate for their plastics. The vast majority have been burnt, landfilled or ended up in the ocean and nature. For about 25 years the US have been sending China its plastic waste, calling this waste recycled, when in reality, most of it was mismanaged.

Jan confirms saying that new plastic production is so cheap that there is no economic driver for collecting all this plastic, washing it, reprocessing it, and making it into a new product. It shouldn't be called recyclable if nobody wants to buy this material.

Sharon concludes that given the declining cost of fossil fuel there is huge projection of growth in the plastic industry.
This is an environmental risk and a climate change risk because all plastic is made from fossil fuel. The companies producing plastic are often the same ones that are in the oil and gas business such as Exxon Mobile, Dow Dupont, Chevron Philipps. So, we have to address the plastic issue and the climate change issue together.

Lots of interesting articles about the issue: https://theintercept.com/staff/sharon-lerner/

16) **David Jones**, CEO and founder of "Just one ocean"

Importance of public engagement in the plastic crisis

He preached for science, education, innovation, alternatives, public engagement, and regulations.

He presented "the Big Microplastic survey": a collaborative citizen science project being undertaken by his UK registered charity, Just One Ocean, and the University of Portsmouth. Microplasticsurvey.org

In March 2018 they conducted the first microplastic surveys using volunteers to gather the data as part of a University of Portsmouth research project. This was undertaken at the entrance to Chichester Harbour on the south coast of the UK. They were amazed at the number of people who were willing to take part in the data collection process. Knowing that the majority of microplastic data collection was being conducted by scientists and while that work remains as important as ever, the drawback was the amount of data they could feasibly collect within any given time frame. So, they decided that a citizen science project could add valuable information to the work already being undertaken by scientists even potentially enhance it.

Today 25 universities and numerous individuals and organisations from around the world have joined the programme. Data collection is now worldwide thanks to the app.

Recorded intervention: https://www.youtube.com/watch?v=fUJ84fVlLeg

17) **Bella Lack**, 16 years old activist and environmental ambassador.

She was not present but through a video she shared her very personal perspective on the **intergenerational aspect of the plastic problem**. For her plastic is an issue that ties into the fossil fuel industry, the CO2 problem and climate change. It is never as simply as it seems.

With innovation we can turn things around "I'm asking you to be on the right side of history and drive the changes that we need to see in our homes, our supermarket and cities".

Recorded intervention: https://youtu.be/iNRu2TtfFtU

18) **Frederikke Magnussen,** co-founder of "A Plastic Planet"

We are all plastic addicts, while **plastic-free is what consumers want**. Her evidence? The huge success of the Plastic-Free Supermarket Aisle set up by her organisation in Amsterdam in early 2018. The initiative reached millions of people worldwide.

They are soon going to launch a resource library on alternatives to plastic: https://aplasticplanet.com/resource-library/

Recorded intervention: https://www.youtube.com/watch?v=ouUCpEtsvww

19) **Jo Royle,** Managing director at Common Seas organisations

Common Seas have 4 programmes:

- Plastic Drawdown: helping governments understand and tackle plastic pollution
- Clean Blue Alliance: delivering practical solutions to cut plastic pollution
- Ocean Plastics Academy: inspiring the next generation of sea champions
- Healthy Me, healthy Sea: research and reporting how plastic affects our health

Healthy me Healthy Sea current focus is the following:
There is a growing concern that plastic pollution is changing the very chemistry of life, but little is known about the short or long-term impacts on human health, or the level of risk posed compared to other pollutants. They have started with an investigation phase, kicked off in 2018 by convening 32 experts from academic institutions, medical doctors, lawyers, environmental organisations and advocacy groups who reached a consensus that plastic pollution is a human health risk and identified urgent research needs.

Three priorities emerged:

- evidence the level of exposure to plastic in our bodies
- explore the link between exposure and disease
- raise the alarm through government, business and public engagement to catalyse policy and behaviour change

Following this, they commissioned research in partnership with Vrije Universiteit Amsterdam to understand if plastic is in our blood and tissue. They will share findings and try to accelerate a new wave of public support and political action to end plastic pollution.

More research is imperative to build a robust case on the health implications of the plastic particles we are exposed to.

They have for example developed new methods to detect the smallest particles as they could not detect them from blood protein.

Recorded intervention: https://www.youtube.com/watch?v=7-aO79PYPPQ

20) **Ogi Markovic,** co-founder and chief strategy officer for Surfing Medicine International

Recorded intervention: https://www.youtube.com/watch?v=717WwBGIf9Y

BREAKOUT SESSION: POLICY AND ADVOCACY

Another breakout session was held to address the use and regulation of toxic additives in plastics, to shed light on the enforcement of existing regulations and provide a legal perspective.

21) **Arlene Blum**, executive director of the Green Science Policy Institute and research associate at UC Berkeley.

She has created a really interesting and short video in which she explains the **6 classes of harmful chemicals her institute have identified, how they function and how to manage them effectively.**

More than 80 000 chemicals are on the market today some are harmful, and many are used in plastics.

There is a lack of transparency regarding the chemicals that are used in our products and in plastic. Even manufacture may not know if the chemicals that are used in their products is safe for our health.

Little is known about the thousands of chemicals that are used in our everyday products and in plastics. One reason is because evaluating one substance can take many years. That is why her organisation decided to classify them in 6 classes: Highly fluorinated chemicals, antimicrobials, flame retardant, bisphenols & phthalates, some solvents, and certain metals.
It is much more manageable to study, follow, and avoids the replacement of a harmful substance by something similar. Because similar chemicals can cause similar health problems. This 6 classes approach is a road map for phasing out all families of chemicals of concern including those found in plastics. Then we can ask transparency of the presence of the 6 classes in our products and if these chemicals are necessary and worth the harm effect.

All of the six classes can be found in plastics. They might be intentionally added as additives, unintentional contaminants from during production, or absorbed onto plastic in the environment.

She also brings to our attention that the greatest margin of profit for the petrochemical industry is coming from the production of plastic and toxic chemicals. Cheap fuel brings cheap plastics that are made useful with the addition of hardly profitable and toxic chemicals. Now that renewable energies are getting cheap enough to compete with fossil fuel, the petrochemical industry is looking at increasing its production of plastic and toxic chemicals to maintain its continuous growth. Plastic production which currently account for 4 to 8% of global consumption of oil today is predicted to rise to 20% by 2050. Do we need this plastic?

Demanding green and healthy chemicals will speed the transition from petroleum, plastics and poisonous chemicals to a new model based on alternative energy, green chemistry and healthy material.

Recorded interventions: https://www.youtube.com/watch?v=D4fyTZ3H1ns

22) **Genon Jensen,** Founder & executive director of the Health and Environment Alliance (HEAL).

How some plastic consumer items fit into the European regulatory framework?

How come electric waste is used to make plastic toys given that we know brominated flame retardant affect thyroid function in children and are linked to neurological brain disruption and attention deficit disorder?

Despite the knowledge on health risk of certain chemicals, 10% of plastic toys she tested on a small-scale survey contained highly toxic and banned chemical.

Why? Because EU, national or global laws currently in place are too weak to solve this problem.

What does HEAL do about it?

- Awareness and advocacy with decision makers
- Push for the recognition that chemicals do affect our health and build laws to prevent that from happening in the beginning

There is a huge discrepancy between the growing movement against plastic pollution and the weak institutional responses that we are getting.

Not only have decision makers evaded the plastic problem for far too long but the main response that we have seen to date, in Europe at least, is the banning of single use plastics which is not enough. Moreover, the microplastic restrictions currently going through the European Chemical Agency is a step in the right direction but won't solve the larger problem which is the weakness of the actual laws that are regulating the chemicals that are in these plastics. That's where we need a change!

We need to cut the plastic production and use, not just recycle it, and we need to regulate the chemicals that are used in the plastic manufacturing process.

We need a serious detox on chemicals. According to the Euro Stat data 75% of the chemicals produced today in Europe are hazardous.

There is hope. The new European Commission and EU parliament could really shine the light of the policy priorities for the next 5 years.

The new European Commission President, who is a medical doctor, who understands prevention, has put forward a zero-pollution strategy for Europe political objectives including reducing exposure to endocrine disrupting chemicals, air quality etc…

We hope this commitment will go into laws because laws are what industries must abide by.

HEAL recommendations:
1) Better, faster, more protective legislation of all the chemicals going into plastics
2) Speed up the identification of chemicals of very high concern that are often used in plastic production
3) Change the regulation pattern so it becomes impossible to replace banned chemicals by chemicals of the same family with very similar properties
4) Make sure that all substances of very high concern can never go into consumer products. This includes getting rid of the double standard we currently have between virgin and recycled plastic, or between EU and imported products

The EU should lead the way on this. Zero plastic pollution means strengthen laws for a serious detox on chemicals and implementation checks today.

Recorded interventions: https://www.youtube.com/watch?v=WHAvcxP8x8w

23) Bjorn Hansen, executive director of the Eur. Chemicals Agency (ECHA).

He joined by video to share the **results of his organisation's investigation into the environmental risks caused by intentionally added microplastics**.

The EU requested the ECHA to investigate whether there is a need to restrict intentionally added microplastics in consumer and other goods.

First, they worked on the microplastics definition: solid particles of synthetic polymers smaller than 5mm in diameter.

Microplastics are found almost everywhere in our environment and humans are exposed to it via multiple route (air, food, water).

Their assessment focused mainly on environment not on the human health angles. The commissions scientific advice mechanism has looked at the human health part and produced a report.

All the uses that the ECHA could identified and their total impact on the environment conclude that there is a concern.

A multiplicity of products uses microplastics: fertilizers, plant protection products, cosmetics, detergents, variance maintenance products, paints, coating and inks, oil and gas industry, construction products, health sector, certain targeted medical food, food supplement. All these uses give rise to emission into the environment where they can be transferred up the food chain which include humans. There is a concern based on scientific evidence.

But nobody is able to find what is a safe level of exposure. So ECHA took a similar approach to the approach used in the chemicals' legislation for persistent bio cumulative and toxic substances.

They found that in Europe, approx. 50 000T of microplastics are intentionally used in these types of products. Among which 36 000T leak into the environment, 6 000T for the sole cosmetic industry which have today alternatives.

There is a need to take action to reduce the emission of microplastic in the environment. Their proposals:
- an immediate ban for all the products that have alternatives: cosmetics and detergent.

- for the rest of the products, give enough time to find alternatives and implement them but without unnecessary delaying the reduction of microplastics emission. Because, due to the persistence of the microplastic, every year that we wait with a specific ban, 30 000 additional tons of plastic end up in the environment.
- the obligation to notify ECHA of any usage of microplastic so that they can assess them and propose a need to limit emissions.

Next steps: the ECHA report was submitted to their committees and then the final report will be sent in the course of 2020 to the EU commission for them to assess and decide whether action is necessary.

Should ECHA invoke the precautionary principal? It is a policy decision which is for the EU commission to take but the ECHA duty and role is to be clear and transparent on the uncertainties around the concern and the fact that they can't quantify what would be a safe limit of emission.

Regarding polymers and plastics in the context of REACH (EU regulation dated back to June 2007 for Registration, Evaluation, Authorisation and Restriction of Chemicals): polymers are exempt from registration requirements, but restrictions and authorisation do cover polymers. That is why they could do this recent restriction proposal.

They also had some other activities notably regarding chemicals used inside the polymers (for ex phthalates or certain brominated flame retardant) and made some restrictions proposals that were implemented in the EU.

Recorded interventions: https://www.youtube.com/watch?v=6UZ6ElSfGUQ

24) Tatiana Lujan, wildlife conservation lawyer at ClientEarth

She shared her insights on **how companies that don't follow environmental policies risk both their reputation and their financial position**. Engagement at the local and municipal level is necessary to hold governments and companies from a policy perspective.

Lawyers try to use many strategies to achieve their objectives. ClientEarth is doing the same.
Plastic is a problem and current laws are not sufficient to attack the plastic issue from an environmental prospective. And regulations move slowly.

Tatiana's organisations went to private law because the ones that are responsible for this pollution, and the chemicals we are in contact with every day, are companies. ClientEarth is therefore trying to do advocacy with companies. How? Having the same language: money. → Plastic is bad for your business!

Plastic is the fossil fuel industries plan B. They won't be able to burn all the fossil fuel, so they plan to make plastic out of it and then burn it in incinerator.
By 2030, the life cycle emissions associated with plastic will be equivalent to 300 coal fire plants, and to more than 600 by 2050. If we continue using and producing plastic at the same rate we are doing today, we will never meet the Paris Agreement target. => Anyone caring about climate needs to care about plastic.

We also know plastics created a biodiversity crisis.

New laws are on their way and there is momentum that we need to use.
Last year the EU adopted in the span of one year, 6 deferent directives related to plastics. It is amazing and unseen before in any other area of work.
China suddenly decided to close its boarders to all the world's trash after receiving most of it for many decades. Other Asian countries are doing the same. This is creating momentum for new

regulations in many countries including western countries that were exporting their waste and now have to manage them themselves.
A report released by the UN in December 2018 said that more than 127 countries have adopted new laws related to plastic in the last 2 years.

Tatiana's argumentation with companies:

- rapidly changing technologies and the accelerating path of new laws are going to make them make rush decisions which are usually bad decisions. If they want to take good decisions, they should future proving their companies against coming regulations, and think about moving away from the system that relies on disposable plastic. This open the doors to new market they did not have access to.
- their brand may become toxic. Nowadays so many companies sell the same things. The differentiators are the loyalty of their consumer and the values they are associated too.
- do their employees think they are doing something good for the world or do they think they are working for a monster? New generations are highly environmental conscious. Where are they going to get the good employees?
- what about all industries that will become enemy? The victims of the plastic contamination such as fisheries and tourism. Fisheries are now suing Exxon, Shell, etc because climate change is moving fish away.
  The annual brand audits about waste collected during the beach clean-ups will soon be used by impacted industries to sue the companies responsible of this contamination.

Banks, insurances, shareholders start thinking that plastic is a business risk as much as climate change. And companies should be obliged to disclose to their investors, banks and insurance the risk they are putting their money in.

If we can find tools to make companies accountable in private law, we can make the change we need.

Recorded interventions: https://www.youtube.com/watch?v=YUOK-30Zm-E

25) **Lisa Kaas Boyle**, Environmental attorney, activist and co-founder of the Plastic Pollution Coalition.

She gave a presentation on the **past successes of legislation and the need to keep harmful products from reaching the consumer through measures**.

We all know that humans are responsible for the current plastic diet of the albatross. But we are not different from them. We are ourselves consuming plastic and we are feeding it to our children as well. Our babies are now born pre polluted by the 100s of chemicals that are used in plastic, then through our breath milk and finally through solid food when they are getting older.

There are 84 000 chemicals being used by US companies, almost none of them have been tested for health impacts. Overtime we accumulate in our body 100s and 100s of chemicals.

If we are surrounded by chemicals in the products we use and the food we eat, are we able as individuals to reduce our exposure? Can we reset our personal body burden and prevent passing these toxic chemicals to our children?
Very simple changes that anyone can make do work to detox our bodies.

How can we prevent the poisoning?
Lisa's strategy as an environmental attorney:

- Draft and promote laws that ban or control the top 10 pollutants that are found on international coastal clean-up day
- Pass comprehensive legislation that requires a circular economy

- Reform our totally inadequate toxics laws
- Require better education for the public and school children so we understand our part in the life circle and become responsible participants in it

Lisa drafted the law to ban plastic microbeads in the US, and also the Californian law to make plastic straws only available upon request.

We need real preventative methods for plastic instead of cleaning-up after exposure.
The damages are done from the beginning: from the fracking and drilling for the fossil fuel, to the manufacture of this toxic chemicals and products, when we use them and we poison ourselves and our foetuses. So, the waste is just the tail end of this very destructive process.
In addition, we need to stop pretending that we can incorporate beats of plastic pollution in products that are primarily made of virgin plastic and pretend that this is a solution. We are still poising ourselves and recreating permanent waste.

One real solution she worked on is on plastic water bottle. She drafted a paper "public policy solution on tap at a fountain near you" where she proposes how we can get back to tap water thanks to water hydration stations. The report also shows the damage the plastic bottle model caused to us and the environment.
Lisa is also working on this new water distribution model for the Olympics in LA.

Finally, she created the app WeTap where everyone can easily localise the nearest water fountain or hydration station.

Recorded interventions: https://www.youtube.com/watch?v=mP69Spuxtrk

26) **Sian Sutherland**, co-founder of A Plastic Planet.

She discussed **the power of the plastic lobby and retrace how we came to exists in the current marketing bubble created by the plastic industry**.

We are all plastic addicts even the one who knows what it is doing to us.

Plastic is the gateway to the climate crisis that we are facing. It's been the enabler of so much that we have done wrong.

The plastic topic is all over the media. They are hundreds of pacts, pledges, policies but for Sian, these are only words, and nothing is slowing down. In particularly the "Alliance to reduce plastic waste" signed by some of the biggest polluters on the planet. For her, it is like "arsonists lobbying for better fire extinguishers". They signed this pact with one hand and signed with the other a massive ramp up in plastic production.

These are the guilty words:
RECYCLABLE plastics is just one step away from the bin, the incinerator, the ocean, the landfill. It's just another delay.
OCEAN plastics why are we glorifying something that should not exist in the first place?
SINGLE USE plastics when most plastics will never become another thing.
We are hiding behind words.

"Recycling is the fig leaf of consumerism". The thing that makes us think it is ok to keep going on.
We haven't invented the circular economy concept. Nature did. Everything goes back to the soil. We've broken nature circular economy concept with the industrial revolution.

Sian created Plastic Planet with her co-founder to say to the world that perhaps we don't need, in 10 years times, 4 times the amount of plastic we currently pomp out every single year. How can we turn off the tap?

1) Legislation/taxation

One big issue is the exportation of plastic waste from western countries to emerging countries. UK only, have been shipping over 60% of its plastic waste to developing countries where there is mismanaged waste issue. So Plastic Planet is pushing for a new law working with 40 cross party MPs in UK parliament, in order to outright ban on the export of plastic waste to developing countries. If we have to deal with our own dirt, we are going to turn off that tap because right now it is invisible to us.

They are also lobbying for a tax on any types of plastic product. Currently plastic is the most subsidised material and industry in the world.

2) Igniting business from within rather than attacking from the outside

Plastic hackathon within biggest polluters companies. They currently work with Unilever to eradicate the 46 billion plastic sachets they produce every year and that are mostly sold in developing countries.

They also have a plastic free certification mark.

3) Open source knowledge of material

They just launched the world's first resource library of plastic free materials to help companies/citizen get out of the plastic box we are stuck in.

4) Giving consumer choice on shelfs

They launched the first plastic free aisle in a Dutch supermarket in February 2019 which is there live lab that now have 3000 plastic free products. No increase in food waste. People from all over the world are coming to visit.

5) Elevating sustainability to luxury

For Sian, the plastic issue is a production problem, so instead of the 3Rs, we have to use the lever of change from Responsibility, Culpability and Liability.

In August 2019, 200 worldwide business leaders got together to redefine the purpose of business. Profit came number 5, behind the preservation of the environment, fair and ethical deals, employees' satisfaction.

There is hope and each and every one of us have way more power than we think!

Recorded interventions: https://www.youtube.com/watch?v=ncUfmuT3HwY

PLENARY SESSION: SOLUTIONS

On this session some speakers introduced their own, accessible solutions to plastic and human health, others shared tips on what everyday citizen can do to reduce their plastic use and exposure.

27) **Troy Swope**, CEO of Footprint sustainable technology https://footprintus.com/

Spoke to us via video where he discussed why **plastics are not just a problem but also an opportunity to create new alternatives and brainstorm innovative solutions**.

Footprint sustainable technology is an engineering driven company. They created a line of recyclable and compostable cups, lids and straws.

He emphasized that plastic is not only a problem of pollution, but a health issue illustrated by the higher number of diabetes type 1. His own daughter is affected.

Suzan Koelen, marketing head at footprint sustainable technology, then came on stage to present some of their products.

She is asking for collaboration and joint action against the plastic industry, for a synchronization in the scientific data, and in the NGO actions.

Recorded interventions: https://www.youtube.com/watch?v=8tEwtfx2zbU

28) **Ana Agostinho**, head of PR and media at Mirpuri Foundation

Mirpuri airline did the **first single use plastic free flight** in collaboration with the Volvo Ocean Race.

Mirpuri is willing to lead the change in the industry. They organised a conference inviting the other plane companies to discuss single use plastic and catering waste. It was the first time the aviation companies were gathered without competing but working together. There was a strong interest on the topic.

On average one flight generates 150 kg of plastic waste. In total, plastic waste in the aviation represents 5.7 million T per year. Plastic is 17% of cabin waste.

The Foundation also donated €5millions into a R&D project to replace plastic bottle. Results will be announced in 2020.

Recorded intervention: https://www.youtube.com/watch?v=OwrRPm1pEnI

29) **Mojca Zupan**, CEO of PlanetCare leading developer in microfiber filtering solutions.

On average 700 000 microfibers are released per washing machine. Every week this is the equivalent to a bag per person.

35% of microplastic is microfibers. “We eat each other’s underwear”

PlanetCare filters are specifically designed to catch fibres shed from textiles and clothes during washing and drying. They manage to filter 90% of microfibers.

For €9,95/month, customers receive one filter accompanied with 7 months' worth of cartridges. Once a year they can ship back their used cartridges and receive new ones.

Used cartridges are then 95% reused & 5% recycled.

They also conceived Industrial filters suitable for laundries, hospitals, hotels, marinas and similar. Also, the solution is perfectly suitable in fashion/textile industry or for wastewater treatment facilities. Fully automated process, no use of chemicals.

Recorded intervention: https://www.youtube.com/watch?v=AD7iTYhAC_U

30) **Fionn Ferreira**, 18 years scientist and engineer old winner of the 2019 Google Science Fair with innovative method to filter microplastics out of water using a magnetic liquid called ferrofluid. www.fionnferreira.com

He grew up in West Cork, Ireland, a very remote region surrounded by the stunning Irish landscape and scenery. When Fionn saw plastic pollution levels increase on the seashore this sparked a determination in him to strive to come up with ways to combat this. He worked with his limited resources at home which

included LEGO bricks and wood to make contraptions to gather, categorize or remove this from the coast. When Fionn heard about microplastics, he became very passionate about finding a way to combat the issue. He decided to start researching and developed a non-harmful way to extract these microplastics from water using vegetable oil and rust powder. To test how efficient this was, he built a spectrometer and a microscope from scratch for his analysis.

He was named the Grand prize global winner of the Google Science Fair 2019 and award winner at the Intel International Science and Engineering fair. Fionn is currently studying Chemistry at the University of Groningen, Netherlands. Like this, he wishes to gather the tools required to solve many more problems in the future.

He presented his work in a video: https://www.youtube.com/watch?v=akCjg2s7xrs

31) **Laura Diaz** and **Madhuri Prabhakar** – Plastic Soup Foundation

The plastic soup Foundation developed various campaigns and tools to help people reducing their plastic footprint.

There first “beat the micro bead” campaign through the app and the website was a great success with the commitment of 400 brands to get rid of microbead in their products.

They also developed a “zero plastic inside” certification. 70 brands obtained it so far.

The new “Plastic diet” campaign give 100 easy tips for our daily life https://www.plastichealthcoalition.org/plastic-diet/

“My little plastic footprint” was launched in Dec 2017 for customers to challenge their knowledge, learn more about the plastic soup issue, and join pledges to reduce their own plastic footprint. https://youtu.be/gUCx-j4Gk_k

They are now working on the Plastic Mass Index (PMI) which will help consumer to measure their progress in their plastic diet.

Recorded intervention: https://www.youtube.com/watch?v=IRZKPYzlhxU

CROSS-MEDIA CONCLUSION ROUND TABLE

It’s not a pollution problem it is a production problem. The industry is responsible.

We must spread the word on the link between plastic pollution and climate change.

If production of plastic is going to quadruple in the coming decade, we cannot pretend that we are fighting against plastic pollution.

Laws on the chemicals must be strengthened. We need a zero-pollution objective.

The plastic industry is using the same marketing technics that the tobacco industry has used for decades. Even worth because the plastic industry knew about the BPA’s effect in the 1930s.

For Cyrill Gutsch, the one to blame are not the brands but the material producers, the petrochemicals companies.

Some speakers said that we should be suing the petrochemical industry. Others mentioned using the brands to put pressure on the chemical industry.

For Cyrill Gutsch, “Recycling is a catalyst debate we are now moving to the conception of new material”. “It is a technology competition on materials, and plastic is just the start.” “Chemicals need to disappear”. The hole economical model needs to be looked at and discussed. We can start with the small countries that can lead and show the big countries how to change their model.

Scientific results, from the 15 research projects financed by ZonMw, will be available in one year and there will be reassuring news and worrying news.

At the end of the Plastic Health Summit, ZonMw stated that the importance of the studies was so great that 1 million euros of extra research money were made available. The scientists were served at their beck and call. In a read-out joint statement, they argue for more (follow-up) research to better understand the consequences of microplastics on our health.

Some ZonMw researchers kept a low profile as to whether their investigation was a reason to take action. Fransien van Dijk (University of Groningen) advises citizens to ventilate their well-insulated homes often and also to vacuum more often so that we inhale less plastic fibers in our homes. Heather Leslie (Vrije Universiteit) characterized the research results as early warnings, alarm bells, which now justify social intervention in the light of increasing plastic production. After all, the concentration of microplastics in the environment and therefore likely in our bodies is increasing exponentially. The longer we wait, the more difficult it becomes to turn the tide.

Maria Westerbos, director of the Plastic Soup Foundation to conclude: 'Perhaps the most important result of the Plastic Health Summit, is that nobody can any longer deny the potential danger of microplastics to our health'.

Recorded debate: https://www.youtube.com/watch?v=uGvoqtdsgNI