The implications of the unprecedented societal and economic disruption from the COVID-19 pandemic are not easy to foresee. This, the second part of this three-session cycle explores near-term priorities for protecting health in the face of societal changes due directly to the pandemic and indirectly to our response to the crisis.

Robert Barouki, from the French National Institute of Health and Medical Research (INSERM), opened The Year After session. This session set out to explore priorities for protecting health. Robert is a leader of the Health Environment Research Agenda (HERA) European project. The overall aim of the HERA project is to set the priorities for an environment, climate and health research and innovation agenda in the EU. For more information, please visit https://www.heraresearcheu.eu/, where you can consult the agenda.

The agenda does not address the pandemic at length. Therefore, a new short agenda is to be produced to deal with the COVID-19 pandemic together with Sustainable Development Goals (SDGs)

Manolis Kogevinas, Scientific Director of the Severo Ochoa distinction at ISGlobal, started by conducting a survey of the audience to find out which parts of the world they were from.

Viewers were mainly from Spain, but also from other parts of Europe and South America.
He went on to describe the Día después as a multi-stakeholder initiative working towards achieving the SDGs. It is promoted primarily by four organizations: REDS/SDSN (Spanish Network for Sustainable Development), itdUPM (Innovation and Technology for Development Center-UPM), ISGlobal and Iberdrola (plus around another 50 organizations signing in as collaborators). It is an open platform, which enables massive collaborations (scientific community, companies, public administration, third sector and citizens), generates proposals emerging from collective intelligence and promotes action. It is based on four thematic communities:

- Environment and health
- Sustainable cities
- Inequalities and new economic models
- International cooperation

He projected one of thousands of pictures on deforestation, in this case from Brazil, and asked, What is the connection between climate change, loss of biodiversity and habitat, human infringements and this coronavirus? He claimed that it is a complex connection, and there are many theories on how it occurred. But the destruction of the ecosystem is surely linked to the appearance of new infections. The question is how this situation can serve to promote a more egalitarian and sustainable society in the wake of the pandemic?

Is COVID-19 mortality comparable to potential increased mortality from the effects of the lockdown on the economy? Although this is not an easy question to answer, he does not think so: mortality from COVID-19 can be expected to be higher. However, the question has to be qualified: Is public health more important than company health? The other issue is that mortality (like life expectancy) is an important health indicator, and, mortality aside, the crisis could seriously detract from wellbeing.

So, why doesn’t he think that mortality from COVID-19 and its economic after-effects will be on the same level? In 1990s Russia, after the Soviet system collapsed from one day to the next, an industrialized country, for the first time, suffered a huge increase in mortality that was not preceded by a war. These patterns are not usually seen in industrialized countries. If we look at life expectancy in European countries in the midst of the 2012 depression, there is a visible trend showing that higher life expectancy is related to a bigger GDP (gross domestic product). The trend declines worldwide for poorer countries (lower life expectancy). Above 20,000 dollars or euros, however, there’s not such a big difference between GDP and life expectancy. Therefore, it is not just GDP that defines life expectancy. Even during a crisis, life expectancy, which is an important health indicator, does not change very much. This means that other variables come into play.

This explains his response to the question regarding mortality from COVID-19 and the economic effects of the crisis. Provided that the crisis is not catastrophic, there is a basic welfare state and social inequalities are not extreme, mortality from COVID-19 can be expected to be greater than potential increased mortality from the effects of the lockdown on the economy. Following on with an example related to Bangladesh, when flooding caused by the moderate cyclone Aila devastated the country in 2009, if we export that situation to COVID-19, it is clear that the effects and responses can be abysmally different between high- and low-income countries.

Last February, HERA (Health Environment Research Agenda for Europe) was submitted to the European Commission. This agenda has now been updated due to the pandemic. It outlines research needs on COVID-19, together with the environmental and health nexus. We identified three main research goals:

**Research goal 1**: Environmental drivers of SARS-CoV-2 emergence and spread.

**Research goal 2**: Health impact of COVID-19 and environmental stressors (e.g., HERA stressed that
there is a lot of research going on within cohort studies in Europe, and these tools should be used to evaluate the effects of COVID-19 and interventions during the coming periods).

Research goal 3: Integrated socio-economic, political and health implications of COVID-19 and intervention strategies. (This has huge implications for lifestyle, health inequalities, depression, anxiety, domestic violence, etc., requiring interventions to support resilience. Manolis briefly mentioned issues like how the epidemic will affect the built environment, transport modes, the redesign of public areas, etc., that will be addressed by the other panelists later. COVID-19 and the work environment is another big issue. It has to do not only with the risk of infection to workforce health, but also the employee stress exposure, as well as other long-term effects, such as the final effect on employment. It is important to know how interventions will be evaluated.)

Then Robert presented the first speaker of the session: Joel Kaufman, who is a professor at the University of Washington (UW). Dr. Kaufman is a physician: an epidemiologist, board-certified in internal medicine and occupational medicine. He has been a full-time faculty member at the UW since 1997, currently holding appointments in the Departments of Environmental and Occupational Health Sciences, and Medicine (General Internal Medicine), and Epidemiology.

PRESENTATION: AIR POLLUTION AND OTHER ENVIRONMENTAL EXPOSURES AND CONSEQUENCES OF CRISIS

Joel discussed air pollution and other environmental toxicants and what needs to be done in this pandemic in the upcoming year in this respect, as well as observations from mistakes and what needs to be avoided.

The observations now show that the decrease of human activity has resulted in reduction of anthropogenic emissions, improving air quality and decreasing emissions of greenhouse gases. This has been more dramatic in areas that previously had higher levels of pollution.

Joel showed several pictures of the air pollution levels “before” and “during” the pandemic in China and India. There were amazing improvements in visibility. Not all data on air quality in the US is available yet, but, anecdotally, people have already noticed improvements.

There is evidence that reduced emissions, particularly traffic-related emissions, are possible. So, there is a window into a more sustainable future where citizens could move towards sustainable energy resources. This would help improve not only the planet, but also people’s health.

He claimed that it is too early for some of the observations he made, but everyone is eager to understand this issue and the scientific questions and research questions that can drive our thinking for air quality:

- Have modifiable environmental factors influenced SARS-CoV2 emergence? Is there something going on as a result of changes in environmental pollutants in particular which is influencing the emergence of the virus itself?
- Did air pollution and other modifiable environmental exposures affect susceptibility to acquisition of SARS-CoV2 infection? Animal evidence has shown that air pollutants increased rates of acquisition of viral infections, including influenza. There are no studies yet regarding COVID-19.
- Did air pollutants and other modifiable environmental exposures affect prognosis of COVID-19 illness? The train of evidence shows that many of the underlying conditions that are behind a worst diagnosis of COVID-19 illness are related to air pollution or other environmental exposures. Once somebody has the exposure to environmental factors, this can affect the development of the illness.
Did air quality improvements during the pandemic result in any health benefits? These last two questions are major issues and affect other things that are going on in the environment and the economy. It is important to think about this, as well as the environment.

How did meteorological factors figure into SARS-CoV2 ecology and what are the implications of climate change on future pandemic risk? Can meteorological factors play a role in SARS-COV2 ecology? It is important to think about the implications of climate change in future risks of pandemics. However, it is difficult to conduct such studies at the present time.

So, there are many lessons to be learned. It is important to understand how these environmental factors affect the risk of future pandemics, or can alternate or mitigate future pandemics. Human and societal behaviour changes are possible, and can result in notably reduced emissions. However, there are mistakes to be avoided.

Improvements in air quality are one of the few things that we can be proud of in this crisis. In many areas, health facilities have found there has been a surprising drop in the number of patients of diseases other than COVID-19, including health events like heart attacks. However, this could be due to a real reduction in disease prevalence or to people being afraid of going to hospitals. Nevertheless, it has been consistently observed that other health problems have diminished, and this is something that needs further research.

There are many other issues to focus on and think about. For example, how can we avoid the setback in the advance towards the SDGs and environmental improvements? At a time when there are about to be substantial real impacts on human economic activity, which are expected to result in a cascade of economic impacts, societies cannot afford not to prioritize environmental sustainability. In face of economic challenges, it is clear that environmental improvements will not be high on the political agenda. However, there is a large body of evidence to show that environmental policies are not only cost effective in terms of improvements but also provide important opportunities for economic development.

Historically, there is a perceived conflict between the perception of a trade-off between economic development/prosperity and environmental protection focused on public health and quality of life. This is a persistent narrative, which, however, is not supported by the evidence. This is a point to be raised with policy makers.

It remains to be seen whether we will see setbacks in environmental protection. Will decreased commitment target health-based environmental protection? Will we see relaxation? There have been moves in the US to reduce environmentally unfriendly activities. Will there be reduced health enforcement based on environmental goals? Many groups had pre-existing agendas “under the cover of darkness” to change environmental policies. They have taken this change to role out regulatory changes and have an existing agenda to reduce these activities.

Over the next year, the commitment to environmental progress will face unprecedented challenges.

Robert presented the second speaker of the session:

Mark Nieuwenhuijsen, who is a research professor, Director of Urban Planning, Environment and Health Initiative, and Director of the Air pollution and Urban Environment Programme at ISGlobal. Dr. Mark J Nieuwenhuijsen is a world-leading expert on environmental exposure assessment, epidemiology, and health risk/impact assessment with a strong focus on and interest in healthy urban living.

PRESENTATION: MOVING TOWARDS MORE RESILIENT, HEALTH PROMOTING URBAN ENVIRONMENTS
Mark mentioned that there are some answers but also many questions regarding the new coronavirus. Transmission reduction measures have been implemented:

- Hygiene/hand washing
- Physical distancing
- Self-isolation when ill
- Light to severe lockdown measures

Some will stay in place for the near future. Lockdown measures have had a major impact on the population. In Barcelona (Catalonia), for example, physical activity dropped by 40%, poor mental health increased by 20% and domestic violence went up by over 20%. But there are also good things, less traffic (70-80%), less air pollution (70-90%) and less noise (-9 dB). Unfortunately, green space visits have also decreased by 90%. However, can we sustain these changes and all, or maybe only some, of these impacts in the long term?

It is known that crises are good at bringing about change. However, you also need knowledge, technology, partnerships, vision and leadership. There is a relationship between how cities are designed and the effect this has on city life. If cities are designed for cars, you get noise, air pollution, stress, less social contact and physical activity, etc... This is all related to morbidity and premature mortality. On the other side, if you invest in active transportation, like cycling, you get less noise, less stress and more social contact. All this leads to a reduction in morbidity and premature mortality.

Because of the physical distancing measures, cities have started thinking about how to make changes. So, how should the available space be used? In a city like Barcelona, 60% of the public space is taken up by cars. Using a car is a good thing for physical distancing, but you cannot have more cars coming into the city, as this would cause many problems. Large cities want to keep cars out, i.e., Paris wants to keep cars out and introduce more space for pedestrians and cycle lanes, and Milan is also trying to change its public space to encourage walking and cycling.

Some solutions are land use changes in order to move towards public and active transportation and greening where possible. There is an issue with public transportation at the moment, because the contagion risk is high. Therefore, it is necessary to raise confidence and focus more on active transportation. Regarding land use, the public space available for people is limited because much of it is taken up by cars, causing air pollution. For example, the blocks that were originally designed for people to walk and cycle around in Barcelona have been taken over by cars in recent years, generating a lot of pollution. The new idea, called the superblocks model, reclaims public space from the cars and gives it back to people. Some superblocks already exist in Barcelona, and the idea is to implement more in the coming years. Mark projected an example of a superblock before and after it was reclaimed, showing how they can help to create more green spaces and walking and cycle lanes for people. A simulation of the superblocks model found that their introduction could prevent 700 premature deaths per year. The lives they would save are mainly related to air pollution (NO2) (291), noise (163), heat (117), green spaces (60) and physical activity (36). A change in the use of public spaces in cities can lead to fewer deaths, improved livability, but also sustainability because of the reduction of cars.

Regarding transportation, cycling is a perfect way of getting around. It causes fewer premature deaths, it reduces air pollution levels, there are no CO2 emissions, and it has the added benefit of providing physical activity.

Mark showed a study by Natalie Mueller illustrating the relationship between cycling (km/100,000 of the population) and cycling modal share (%). As safe cycling infrastructures in cities increase, the cycling modal share also grows up to a maximum of about 25%. At some point, however, this relationship breaks down. The take-home message is that if you want people to cycle, you need to
High risk of infections. No vaccines, no treatment, high proportion of severe cases, fairly high mortality.

Provide adequate infrastructures. From the health viewpoint, 10,091 deaths could be prevented in 167 European cities (75 million people) if the cycling modal share increased up to 25%.

Green spaces are very important and beneficial, but there are generally notoriously few in cities. Greening cities can increase life expectancy, reduce mental health problems, improve cognitive function, mood and babies’ health. It can create a healthy environment by mitigating air pollution, heat and noise levels. Replacing roads and car parks with green environments is one potential way forward for transforming a detrimental into a beneficial environment.

A new 2020 study found that over 400,000 premature deaths could be prevented each year in Philadelphia by just increasing the tree cover from 20% to 30%. There are particularly important benefits to be gained in lower socioeconomic areas. A multisectoral approach and a systemic approach are needed to tackle the situation: public health professionals have to work together with transport planners, urban planners and architects to improve cities. Systemic approaches addressing different problems—health, liveability, sustainability, climate change and equality—are needed. They should now also account for COVID-19. This will cost money, which should be spent properly to save lives in the long term and create more agreeable spaces and sustainable societies.

Is this possible? Mark gave some examples to explain why he believes it is. Seoul and Liverpool are cities which have undergone huge changes in recent years, Hamburg aims to be car free by 2034, Freiburg is a neighborhood with sustainable housing, no cars, where trams and cycling are the options for travelling to the city centre.

He finished his presentation by recommending a recent article and book. His take-home message was: green cities, healthy people; active cities, healthy people; clean cities, healthy people; social cities and healthy people.

Robert presented the third speaker of the session: Elisa Sicuri, who is associate research professor, ISGlobal. Elisa received her PhD in Economics from the University of Pavia (Italy). She is associate professor at the University of Barcelona and is associated with the Centre for Economics, Sorbonne University. At ISGlobal, she is currently leading the economic streams of the CRUZIVAX and FREEBILY projects. Since 2015, she holds a position as research fellow at the Health Economics Group, Department of Infectious Disease Epidemiology, School of Public Health, Imperial College London, where she currently leads a Global Challenge Research Fund-Research England project and has been working on several projects related to malaria (e.g., RooPfs), HIV and hepatitis.

**PRESENTATION: COVID-19: PRIORITIES FOR LOW- AND MIDDLE-INCOME COUNTRIES**

As there is still not enough information and evidence on the economics of COVID-19, Elisa stated that she preferred to put forward some hypotheses. Although the consequences for low- and middle-income countries (LMIC) are potentially much worse, the situation with respect to COVID-19 is the same for both high-income countries (HIC) and LMIC:

- High risk of infections.
- No vaccines, no treatment, high proportion of severe cases, fairly high mortality.

Although the evidence in this respect is still unclear, both COVID-19 and public health measures to avoid infection transmission appear to be disproportionately affecting the poorest, where “the poor” are a huge proportion of the population in LMIC.

In the absence of non-pharmaceutical intervention, the best option for avoiding the transmission of COVID-19 is behaviour (masks, hand washing and social distancing). This is basically moderated by risk perception: the higher the risk perception, the better people behave. Risk perception is influenced by knowledge. These three factors are all impacted by other factors with no linear effects. Behaviour can, for example, affect risk perception, since the risk perception of someone who is
behaving well may decrease, leading him or her to relax his or her behavioural standards. At the same time, other factors —income/wealth, “place”, social conditions, epidemiological conditions, sex and education— have a bearing on these three factors. All these factors have an impact on knowledge, risk perception and behaviour. Therefore, this complex panorama makes it hard to get to the bottom of what really affects behaviour.

Elisa’s team recently tried to analyse this complexity in Guyana, South America, for some selected vector-borne diseases (malaria, dengue fever, zika virus and cutaneous leishmaniasis). They used a structural equation model to understand the interrelationships between the factors. This model studies the behaviour designed to prevent the above diseases. This behaviour is very different from what is required to combat coronaviruses, where social distancing is one of the main measures. Preventive behaviour for vector-borne diseases is conditioned by bed nets, IRS, fogging, repellents, coils and screened windows. These interventions/measures act to kill the mosquito (vector) or impede contact between the mosquito and the victim. In this case, behaviour is directly affected by knowledge and risk of infection, wealth and region (environmental socio-economic conditions of the region). Indirectly, behaviour is influenced by the region (through risk and knowledge), education (through knowledge) and wealth (through risk). Ultimately, behaviour then decreases risk perception, which also has an impact on risk perception. Therefore, they found evidence of a bidirectional link between risk perception and behaviour.

They suggest, as a policy recommendation to promote the target behaviour, that correct communication is key to improving the knowledge of people with the aim of reducing risk and shaping risk perception to promote the right behaviour. They also found that the country’s poor have need of free interventions, subsidies, loans, etc., to be able to access prevention.

How can this be used for COVID-19? Correct communication is likely to be key for both HIC and LMIC. The majority of the population, and particularly the poorest, will require free interventions (free masks, gloves, treatment and vaccines). However, COVID-19 differs from vector-borne diseases on one important point: the main barrier to avoid transmission is social distancing. Rather than erecting a barrier against the vector, people have to physically distance, which generates a barrier to people engaging in economic activity. This adds another impact to disease prevention complexity: social distancing is likely to have a bearing on, and lower, income and wealth. If, on top of free interventions, financial aid is not immediately forthcoming, social distancing will trigger a negative feedback loop, as it will result in income loss leading to more infections. Financial assistance for people can help to reverse this situation.

To conclude, what economic consequences COVID-19 is likely to have in LMIC? There is some evidence from the US and Britain to suggest that, indirectly, COVID-19 is hitting specific ethnic minorities especially hard. If these people have lost their job, remittances will not be sent to Sub-Saharan Africa, also causing impoverishment there. In the short-term, it is necessary to activate some sort of safety net: cash transfers, sick leaves, healthcare subsidies, etc. This is something that should already be in place and should continue beyond COVID-19, even though, unfortunately, it is still not the case.

To continue the session, the moderator asked the panelists a number of questions:

(1) Following the COVID-19 pandemic and the resulting economic and social crisis, should we change anything on the climate and global change agenda?

Joel Kaufman replied that probably not. He stated that we need to push back the notion that we need to lose our focus on environmental and climate agendas. He claims that we now have evidence to suggest that these issues are more urgent than ever. The agenda and movement towards the SDGs continue to be of primary importance.
What are the urgent actions now needed from cities that can become long-term contributions to the planetary health agenda? Can we do something now that can become very important for the future?

Mark Nieuwenhuijsen replied that it is urgent to make better and more sustainable use of the public space, to get people to walk and cycle, as well as to move towards green spaces. The COVID-19 agenda goes hand in hand with the climate change agenda, it does not change things, and, if anything, there is more urgency. Cities can normally make changes quicker than national governments (climate change actions, for example, were held back by governments and policies). Cities have been taking the lead with climate change and also with COVID-19, since people are much closer to local governments. He highlighted that the opportunities are there now, and changes are needed now. In a few weeks, people will revert to their old lifestyle, and it'll be too late: change is needed now. Robert asked Mark if he regarded this as an opportunity or a threat to the environmental agenda, and Mark replied that it is an opportunity.

There will be a lot of investment from governments in the coming months. If you were advising national governments, What would be your top three recommended strategies to achieve economic recovery, as well as health and wellbeing?

Elisa Sicuri replied that she didn't know exactly. She noted, however, that it is important to distinguish between the short and the long term, as is usual policy in economics. In the short term, the top priority is to guarantee that people will not go hungry, which applies mainly, but not only, to LMIC. To do this, she stated that there was a need for evidence-based safety net provisions, like unemployment benefits, cash transfers, etc., to guarantee that people who are staying at home can eat. Inequality was already there before COVID-19. In the long term, however, COVID-19 will worsen the situation and show up previous mistakes. We need to look at people's long-term equality and wellbeing. This requires wise government, as well as good fiscal and redistributive policies, because it is not something that can be fixed in a month. She highlighted, like Mark Nieuwenhuijsen, that there is now an opportunity to make this change.

Where do you expect the political leadership to come from in Europe that is most likely to reach the social and environmental policy changes to advance towards the SDGs?

Mark Nieuwenhuijsen replied that it is difficult within Europe, since it is rather divided and people are reverting to national policies, which, he highlighted, is a shame. Policies and decisions mostly follow the money. So, this is what will decide what the future will look like. The Green Deal is also important for knowing if we are moving in the right direction. It is also important to look at leadership in communities, and one of the outcomes of the current crisis is that people are looking to their own community more. There are many actions, like people clapping at 8 pm, or looking after the elderly, etc. We need to build up from the grassroots and send the message that we do not want to go back to how it was before. We should also send the message that we want to put the money into economic activity that is good for our environment, health and also for reducing inequality.

Who is best placed to make these decisions happen? National, state, municipal, governments, civil society?

Joel Kaufman stated that there are no right answers: the answer would be all of the above. Society should push for these changes to be made. There'll be pressures and special interests now, so a big push is needed for things to happen for the benefit of all. Civil society should push up, and other forces will push towards the wrong objectives.
(III) Who is best placed to make these decisions happen? National, state, municipal, governments, civil society, especially concerning other countries?

Elisa Sicuri replied that coordination is the most important thing. It does not make sense for one country/region to do something if another does not. Ideally, we should all move in the same direction internationally. In practical terms, however, this is very difficult. Small-scale decisions can help to make it work.

(IV) Should more open spaces be favoured?

Mark Nieuwenhuijsen replied that people have suffered with mental health issues during this crisis. Open spaces have shown to be effective at reducing mental health problems. Parks should be open so people can relax and reduce stress. Nature is very important for people, and it’s particularly lost in cities, so it is very important. For example, there are some places in Germany where kids are going to school in parks instead of classrooms. This looks like a big opportunity, since it’s reducing transmission risks, and having them enjoy themselves.

(V) Concerning the most vulnerable people and food security and access:

Elisa Sicuri replied that in the short term, everything that can be done to make sure that people do not go hungry needs to be done. However, she could not say what is the right solution and stated that we should trust people. There’s evidence stating that cash transfer works, and that people use it for the right reasons.

(VI) Specially in some countries, there has been a great impact on digitalization, so what do you think of that, particularly from your focus?

Elisa Sicuri replied that it’s all part of the same idea. There are some parts of the population that don’t have access to basic things. So, how can it be that kids don’t have a computer or internet access? They didn’t have these things before, but now they are a necessity, and we are wondering how this can be. Well, unfortunately, we are not all equal. It is a very good idea to try to resolve these problems. The objective is overall equality.

To conclude, Robert asked all the panelists to share with the audience their main take home message from the discussion:

Elisa Sicuri said that this situation should be viewed as an opportunity.

Mark Nieuwenhuijsen believes this crisis is an opportunity to change our cities for the better. A lot of people have suffered loss of jobs, etc., so it’s important to make sure they have enough support and to make our cities healthier, carbon neutral, liveable and healthy.

Joel Kaufman added that next year is going to be extremely challenging, and that we will face things we can’t even anticipate. Therefore, it is important to keep our eyes on the price of making sure we come out in a place closer to where we want our world to be regarding health and the environment, even though it will be challenging.

Robert Barouki concluded by saying that this is an international problem, and we are not giving it enough governance at the international level. This could be a problem for the future, and we should work on that more thoroughly and quickly. Otherwise, it may be too late.

Thank you!