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Item: **ADDRESS BY ANNA WIRZ-JUSTICE, PROFESSOR AND RESEARCH FELLOW AT THE CENTRE FOR CHRONOBIOLOGY, PSYCHIATRIC HOSPITAL OF THE UNIVERSITY OF BASEL.**

Audience:	Male 16+ N/A	Female 16+ N/A	All people N/A
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MARK KENNY: Senior Vice President and International President of the Press Club, Ken Randall, and prior to that on behalf of the Minister for Health, Tanya Plibersek, the chief executive of the National Health and Medical Research Council will be presenting the ASMR medal. We'll do that on air at the beginning and then we will - Ken will invite our speaker to speak and we will take questions from the head table initially. And then I think there is capacity for questions by those in the profession of this eminent person, so we will go through three or four questions and then we will go to the floor. Our floor manager and Hannah will have microphones and you just raise your hand if you're interested in asking a question and then we will be able to take the microphone to you.

We would ask you to, sort of, when you stand up to ask a question, if you are asking a question, just to identify yourself and your organisation and, you know, propose the question, and more questions we can get in, the better. It will be a better quality TV program. So those are just a few words. Welcome, and if the only



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housekeeping matter I have is the - if you have a mobile phone or other electronic device, we would be grateful if you would switch it off preferably or, you know, or silent, et cetera.

There's another address tomorrow. If anyone is interested it is Bill McKibben who is the co-founder of 350.org. He is a renowned - one of the world's leading renowned green journalists and quite an interesting character. And next week is Peter Anderson from the Chamber of Industry and Commerce. So those few words, and on behalf of the board and the ASMR, welcome everybody and we're going to be underway fairly shortly. We are going to invite our speakers and medal presenters, as the case may be, to make their way forward. Thanks very much.

[Laughter]

MARK KENNY: Ken was selected for State of Origin.

[Laughter]

MARK KENNY: Ken is going to present from - he is going to stand - right. Then we will go to the medal presentation. No, you won't stand for that. You will just do the intro. [Indistinct] will do the intro sitting down and then he will hand over straight to you.

KEN RANDALL: Okay.

MARK KENNY: And then when you exit...



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[Silence]

KEN RANDALL:

Ladies and gentlemen, welcome to the National Press Club and today's National Australia Bank address. We are very privileged today to have so many distinguished medical scientists in the room as well as our guest, Dr Anna Wirz-Justice, who is an Emeritus Professor and research fellow at the Centre for Chronobiology at the Psychiatric Hospital of the University of Basel in Switzerland.

She is the winner of - or the awardee of this year's Australian Society for Medical Research medal, an event which we have celebrated here for quite a number of years now and we are about to do so again. The presentation is to be made before the Professor's address today by the chief executive officer of the National Health and Medical Research Council, Professor Warwick Anderson, on behalf of the Minister for Health and - Warwick.

WARWICK ANDERSON:

Well, thank you, Ken.

[Applause]

WARWICK ANDERSON:

Thanks very much, Ken, and it is a great pleasure and a privilege for me to be able to award the medal to Anna. This is a medal of the Australian Society of Medical Research, our peak professional body for health and medical research in this country.



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ASMR has over 18,000 researchers working with them to promote the benefits of health and medical research, and a further 100,000 or so Australians through part of a corporate and patient based foundation membership. The award recognises the recipient's scientific achievements and also their advocacy for raising the awareness of just what medical research does for society, and so it's a great privilege, as I said, for me to be here on behalf of Minister Plibersek to announce this award.

Ken has introduced Dr Wirz-Justice's eminence already. What he didn't say is that she started off as a New Zealander, although she assures me that she is now fully Swiss and the ambassador is in the audience so I thought I would just mention that, Anna. Previous medallists have included the president of the Canadian Institute of Health Research, Dr Alain Beaudet, the West Australian Nobel Prize laureate, Barry Marshall, in a memorable address in 2011, and Baroness Professor Susan Greenfield the year before that.

Dr Wirz-Justice's work has transformed the way we think about how our daily rhythms, the light-dark cycle, affects our health in many ways, especially our mental health and she is a world leader in this particular field, not only in the research but making sure that patients benefit from her work. And, of course, in these days where so many Australian workers and workers around the world, including in the health area, work in shift work conditions, this is a very large health issue for the country. So, Anna, congratulations. Let me award the



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prize to you and congratulations again for your marvellous leadership. Thank you.

ANNA WIRZ-JUSTICE: Thank you kindly.

[Applause]

ANNA WIRZ-JUSTICE: Thanks.

WARWICK ANDERSON: Thank you.

KEN RANDALL: Thank you, Warwick. I haven't endeavoured to cloud the record about Dr Anna's New Zealand birth but I thought it would be appropriate to [indistinct] just a little.

ANNA WIRZ-JUSTICE: That's all right, mate.

[Laughter]

KEN RANDALL: She has a long list of awards and achievements over the years. I won't go through them all. You can find them easily on our website and, undoubtedly, on hers. So please welcome our guest speaker today, Dr Anna Wirz-Justice.

[Applause]

ANNA WIRZ-JUSTICE: Thank you very much for this wonderful award. I am greatly honoured and deeply moved to have received it this year. It's been a great experience so far moving



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around the country with this marathon tour of the ASMR. It's an extraordinary organisation, and I have been most impressed with the young scientists, particularly the women scientists, who are doing a lot for coordinating research and making sure that there's a lot of teamwork going on, as well as being impressed by federal and state governments who are building new medical research institutes. Quite an achievement.

The ASMR brings together scientists and politicians, researchers and clinicians, students, patient advocates, government and funding agencies, to underscore the importance of research for the health of communities everywhere. The society is recognised as the peak body representing medical researchers in Australia, and has a long history of public, political and scientific advocacy. I recognise, as I said, the unique quality of the ASMR as an extraordinary organisation and it has been going for over 50 years. That's really quite amazing.

We are fortunate in Switzerland, which has no natural resources apart from those scenic Alps, that our main funding agency, the Swiss National Science Foundation, provides major investment for basic research in all disciplines - about 40 per cent goes to biology and medicine - with the credo, knowledge is the key to the future and research creates knowledge. We mine brains, and I am impressed here in Australia at similar commitment, and the institutes that are growing up around the country will, I hope, in these hard times,



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have funding available to attract and maintain world-class researchers in these institutes.

An institute is not only a gorgeous new building. It has got gorgeous researchers in it, working together, but it needs gorgeous money to keep it going. That's a very important message. All countries face an unprecedented health and economic challenge, particularly regarding ageing expenditure. We believe that cross-disciplinary and collaborative research are essential to build up knowledge for prevention, intervention and innovation, and reduce the unsustainable escalation of health spending, safeguarding both community and government.

The Australian Nobel laureates, Barry Marshall and Robin Warren, have emphasised that breakthroughs from left field are very, very important in health and medical research. Advances come from discovering cures, and these arise from curiosity-driven research, and my message today is going to be rather similar, since a lot of clinical applications deriving from my field of circadian rhythms and sleep regulation were rather unexpected. So I would like to tell you some stories about research, adventures in the counting sheep trade, to show how surprising the life of a researcher can be; how unexpected findings lead to therapeutic options, especially when you're not looking, even though you thought you were. And don't tell anyone how much fun we actually have in this intellectual activity, when we're not writing endless grants, reviewing papers, fighting for our lab space, competing with our best colleagues, neglecting our families



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through addictive behaviour, and enjoying the rare moment of drinking a mojito or two with the team by the river Rhine when a paper is finally accepted.

So the first story I'm going to tell you is about something that everybody knows, but hadn't been proved: we can't fall asleep with cold feet. So we proved that - very serious research. Distal vasodilatation - the warming of hands and feet - is the physiological gate to sleep. The diagnostic implications of this simple finding are that any circulatory problems, such as people have with age or with vasoconstricting medications, or even lying in bed worrying, is that next grant going to come in, don't allow this warming to happen and may underline many problems of falling asleep.

Now, this research has not led to any gene therapy, but the high-tech solutions we propose are hot water bottles, bed socks, a warm foot bath or an evening soak, and additionally taking melatonin, the so-called hormone of darkness, that naturally induces this thermoregulatory cascade. I think it's important that GPs be informed about the importance of this basic mechanism, and not dismiss the old grandmother remedies out of hand. They work as an important physiological trigger of sleepiness and may help many sleep problems, so try them out before moving to prescribing sleeping pills.

Economic savings are obvious, though the market in patented bed socks might go up. Conversely, distal vasoconstriction, cool hands and feet, is important for



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staying awake. Luckily this room is cool, or else you would be nodding off at your afternoon siesta. The idea is to keep the environment cool if you have to drive a lot, or if you're working on the night shift, because that will keep people awake. A very simple piece of research. What's the message? Understanding the basic physiological underpinnings of sleep has repercussions for health and work. Better diagnosis and cost-effective treatment of many sleep-onset insomnias and strategies for combating sleepiness in the workplace and preventing accidents.

The second story: light is not just for vision. The recent discovery of a new photoreceptor, in addition to our rods and cones that we need for seeing, has really transformed our understanding of the functions of light in all living creatures. This new photoreceptor transmits light directly to the biological clock in the brain, and light is necessary, through this pathway to synchronise our biological clock to the 24-hour day. If we don't get enough light, as perhaps blind people don't, our rhythms will drift out of sync with the day-night cycle.

And there are other surprising effects of light, the non-visual effects. The rapid increase in alertness - so again, cool rooms and bright lights for the night shift to keep people awake. It also affects mood, cognition and sleep. There is a whole range of other brain areas and other functions that are affected by light, than just by seeing. So light is a very important drug that a lot of us are not getting enough of. In spite of, or because of, the high sunshine rate in Australia, and the avoidance



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of UV exposure, we're not only seeing vitamin D deficiencies here, but I think a lot of sleep and mood disturbances may be related to living, as it were, in biological darkness. Our visual system gets enough light to function, but our non-visual system - the biological clock - does not.

So you can see there are implications for ophthalmology. Many eye disorders may lead to sleep disorders, and eye doctors don't usually ask those questions to their patients. When we get older, the lens becomes yellowish. The new photoreceptor is very sensitive to blue light, so with a yellow lens you have got a super sunglasses which filter the blue light, which is important for the biological clock. Cataracts do the same, glaucoma does, and I talked about blind persons.

There are implications beyond medicine. The implications of environmental light as a synchronising agent is exemplified by a very long-term study by a Dutch group in Alzheimer's patients. They found that by putting lights on the ceiling of the day room where the patients spend most of the time - it took a couple of years, these are long-term treatments - but they slowed down the cognitive decline. Many drug companies would love to have the similar effects that we found with this light. It was extraordinary that they didn't get worse as fast. It improved the sleep-wake cycle, their daytime functioning, the depression, and the capacities for daily living.

So that's why I'm spending some - a lot of my time working with architects and lighting designers to get



science-based, chronobiology-based lighting systems developed that we can install in a couple of nursing homes in the region of Basel, as the first ones. But I think this approach can be used everywhere, even in sunny Australia, because Alzheimer's patients don't get outside as much.

We hope that by improving the sleep-wake cycle, and improving the lighting, we may reduce medication and, indeed, in the long-run, falls due to sleepiness. Again, while it's cost-effective and complementary to other treatments, improving environmental lighting to simulate daylight may even be preventive, if applied early enough in illness-development, such as mild cognitive impairment.

So the message - again, we're going from basic research to a treatment - discovering of a novel photoreceptor in the eye, led to a completely new understanding of a different role of light, with implications for health. We need light for the biological clock, to synchronise our rhythms, and, I hope, it will lead to a new era in architecture and lighting design, not only working on the aesthetic of light, but also the biological effects of light. And to think that weird studies on an ancient fish led to a new therapy, I think this is one of these ideas you never know where it's going to go.

The third example I want to bring you is the role of seasons rhythm many species. When we look at the private life of hamsters, in summer they reproduce and in winter when the days get shorter they go into



hibernation and, as experimenters do, you manipulate the day length and you can manipulate the behaviour of the species. It was then discovered that the duration of melatonin secretion in the night was the signal from the day length to the body that it was spring, winter, summer and long nights gave long melatonin secretion in winter, short nights short secretion in summer and, again, you could manipulate the duration of melatonin secretion and get the same behavioural effects.

Then one patient in America saw this data published in a minor journal such as *Science* and discovered that - or went to the researchers, the psychiatrists at the National Institute of Mental Health in Bethesda and said, I think I'm like these hamsters, I go into hibernation for six months and then I wake up in spring and this has been going on for 20 years. They treated him with simulation of a spring day, dawn and dusk light and that's how light therapy began. I think this is, again, one of these interesting examples in research. One patient begins a whole field of research if they give the right information and if the researchers pick up what it is.

Decades of clinical trials now have shown that light is equivalent to or even better, dare I say it, than conventional anti-depressant drugs not only for winter depression which it is its main application, and the winter blues which is not so strong but about 10 per cent of the Swiss population have winter blues, two per cent of whom are winter depressives but it's also working in other kinds of depression. It takes a bit longer, but drugs also take four to five weeks, and one



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of the studies we've done is looking at light therapy in depression during pregnancy, where I think this is a very important application to give a treatment that actually works without effect on the foetus. So there are possibilities of using light with or without antidepressants in many forms of depression including bipolar depression.

I've talked about Alzheimer's dementia. They need much longer treatment. There are studies in Adelaide, in Melbourne, in Parkinson's patients that you actually can improve Parkinson's symptoms and not just the mood. Many ramifications in different psychiatric disorders such as borderline personality disorder, we've done a study looking at light therapy to help their sleep-wake cycle and in schizophrenic patients - we're not treating those illnesses. There are many other treatments, but we're adding a non-drug possibility to improve sleep-wake and thereby a lot of the other symptoms actually get better, even though it's not a direct treatment.

Indeed, in internal medicine there are some studies being carried out in hospitals where patients have very problematic sleep disturbances, such as after kidney transplants. That's a study we're doing in Basel and that we can improve the sleep-wake cycle and their quality of life without interacting with the immunosuppressive medication so that's another advantage. Again, shift work, jet lag, schools, hospitals. There's a lot to be done with respect to lighting.



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So the message of this little example, the buzzword translation I think is really applicable here. Dissecting the role of the biological clock in seasonal behaviour in a hamster has led in one step to a clinical trial and to clinical therapy. Light is becoming established as a psychiatric and medical treatment, though, because it can't be patented and sold as a pill at a profit there is not a big marketing push to use it. So here, I think, government and clinical guidelines are needed to recognise the usefulness of this evidence-based, highly useful treatment, and that's what we need to do now, to have advocacy because we don't have the money that drug companies have.

Additionally, the importance of light as an alerting agent to enhance performance, diminish errors and prevent accidents in the workplace will lead to lots of applications.

My last story is about teenagers, why their clocks are late. Chronotype describes the natural sleep timing preference. Each of us knows exactly when we would like to go sleep and wake up and how long we want to sleep. It's mostly determined by our clock genes. I have to say in brackets when I first began in biological rhythms that was a very weird field. People didn't take it seriously but with the discovery of clock genes then everything became very serious, and they have been - played an important part. We know an enormous amount about clock gene function and that indeed clock genes influence other functions but I am not going to go into that because I am a whole body physiologist.



The early lark and the late owl, they are the ones who suffer from what we call social jet lag. You know what jet lag is. Well, social jet lag is when you have a body clock that is too early and too late - or too late with respect to social, work times, school times and you never land, whereas, when you travel in an aeroplane you eventually get somewhere and re-adapt. These people have problems in adapting. It causes real somatic and psychological problems. The genetic predisposition is modified by age, so as soon as puberty hits around 12 teenagers go to bed later and later until 20 when adolescence theoretically stops and then they get earlier and earlier until old age where - old age they are early larks, just like little kids who wake up very early in the morning.

It's not their fault. That's the message I keep trying to get out. The kids don't go to the disco just like that. They can't go to sleep. They can't go to sleep earlier, and Switzerland is renowned for its clock function in terms of, well, very successful industry but also because they'd like to think that everybody should go to work and to school rather early in the morning, and being a New Zealand owl it has been a tough time getting to work on time and, you know, you have to get to work on time, for the last 40 years but now I don't have to. Now, I can shift wherever I want to.

So these biological factors for teenagers need to be recognised in shifting school to later times than for primary school kids. Given that one of the major functions of sleep is for consolidation of what we have been learning the previous day, getting enough sleep is



extremely important for doing well at school, and I thought one of the functions of school was learning but the last 20 years in Switzerland trying to get school just to move half an hour later has not yet been successful.

So, in summary, our 24-7 society disdains sleep as a waste of time, yet when we recognise that the memory consolidating and recovery functions of sleep are essential for daytime performance and mood, perhaps it will be given the respect it is due. The cost of mistakes, poor performance, depressed mood and physical illness, and there are now strong links to diabetes and obesity, that arise from this chronic sleep debt that most people have are enormous. Sufficient sleep and well-synchronised rhythms are an essential underpinning of good health. I've given you far too much basic science for a press conference, but I hope the few examples I've given you indicate that indeed basic scientific research may lead to new diagnoses and new treatments.

One of the health and economic challenges all countries face is the increased expenditure relating to the ageing population. I've tried to show that basic research, investment in this research in my field of chronobiology, has indeed provided cost efficient non-drug methods for maintaining health and wellbeing in age and dementia through specific lighting. The knowledge gained about the basic circadian system, how it ticks, reaches out to preventive medicine, and innovative solutions for treatment interventions. I think there's a lot that can be done and the future is wide open.



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To finish, I would like to quote from a marvellous essay that Lewis Thomas, a medical doctor, wrote 40 years ago, and it's still rather apposite: in these days of impact factors, research assessment, tight funding, high competitiveness and mega-consortia, we need to remember how research actually works. Perhaps I'm still rather idealistic, being one of the 68ers, but science began with ideas, it begins with ideas and it gets carried out with good collaborations.

What he wrote was science seems in need of better control, more efficiency, less unpredictability. We would like to pay less for a more orderly business schedule. The planners are trying hard to be helpful with new programs for the centralised organisation of science, especially the bio-medical field. Then he goes on: when the problems are very hard and complicated, the science has to be lifted for a preliminary turbulent zone of outright astonishment.

Therefore, what must be planned for in the laboratories is the totally unforeseeable. If it is centrally organised, the system must be designed primarily for the elicitation of disbelief and the celebration of surprise. Doesn't sound what we hear today. And he says what needs is for the air to be made right. If you want a bee to make honey, you do not issue protocols on solar navigation or carbohydrate chemistry, you put them together with other bees, and you better do this quickly for solitary bees do not stay alive, and you do what you can do to arrange the general environment around the hive. If the air is right,



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the science will come in its own season, like pure honey.

To get back to the bar on the banks of the Rhine, we were just sitting around at full moon and someone said, I wonder what our sleep data look like when analysed according to lunar phase. Now, given that this is one of those folk myths that everyone believes in but has never been shown properly, except in tidal [indistinct] and other creatures where it's ecologically relevant, this comment was given rather short shrift and we continued drinking.

However, my colleague Christian Cajochen secretly dug out the files of carefully controlled sleep studies carried out in our bunker, isolated from time cues, and did some post-hoc analyses. He found that, yes indeed, the full moon lengthens time to fall asleep, reduces sleep duration by 20 minutes, deep sleep by 30 minutes, and worsens subjective sleep quality compared to other moon phases. He was very reluctant to publish this given the anticipated scepticism, but every type of analysis yielded the same results. So it will soon be in the scientific canon and you may go home and sleep well tonight under the waning moon. Thank you for your time.

MARK KENNY:

Thank you very much, doctor. In our period of question time today, I would like to start by asking you a couple of things a bit more broad than your speech today, but about the general understanding of psychiatry in western communities.



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I was very impressed by an interview I saw recently with a veteran British actor who grew up believing that his father was a bit of a tyrant and a very insensitive person until he examined his records in the Imperial War Office in London and discovered that he had been dubbed severely shell-shocked after the Second World War. A condition, I suppose, these days we generally describe as post-traumatic stress disorder. Do you think things like that are well understood and are the subject of sufficient research to find effective treatments for them?

ANNA WIRZ-JUSTICE:

That's a very good question, because mental health, as everybody knows, still retains this stigma. People don't talk about it openly. Depression - coming out about depression has become more fashionable. When a famous footballer in Germany committed suicide, it really started things going in Europe. But other mental illnesses like schizophrenia or post-traumatic stress disorder, they are not very much talked about, and I think we just need a lot of information about these illnesses and how they can be treated, as well as research for - I say alternative, because light therapy goes, sometimes, under the rubric of alternative, even though it's totally based on this hamster model. It's a neurobiological treatment.

But we do need to look for additional treatments that can help people, and many people don't want drugs. I mean I come from Basel, there's a lot of drugs being made there. Another treatment we've been looking at for the last 30, 40 years now for major depression is one night sleep deprivation and about 60 per cent of



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depressive patients get better. They only get better for another day and then when they sleep again they get worse, but if you think here is a change in clinical state within a matter of hours, there's a new drug in there, and what people don't have is a very fast drug for anti - for treating depression. It still takes three to four weeks.

And when we combine this sleep deprivation which we now called wake therapy because that sounds much more positive than taking away sleep from sleep disturbed, depressed patients. When we combine it with light or with classic medications, we get a rapid response within days which lasts for months and, again, this is something - how do you patent staying up all night, how do you pay for it from the insurance companies? How do the clinical guidelines get organised? These are all very political questions and I've had not very much success, but I will continue to fight for our biological treatments to help people get out of their serious depressions rather more quickly than with conventional treatments.

And I think information is important and more research for better treatment. In most drug companies, CNS research has been shut down. They don't want to make anti-depressants because it's too difficult. I don't know whether I've answered your question. I've just gone off on a tangent as usual.

MARK KENNY:

I don't know whether it's possible to give a definitive answer, but one of the reasons I asked you a question like that is that we still have, particularly in what we



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broadly call the west, thousands of people going to unusual war-like situations and coming back and suffering all sorts of consequences for themselves and their families. Do you think there's a sufficient understanding of that among the people who are supposed to look after them?

ANNA WIRZ-JUSTICE Well, I'm not a psychiatrist, so I can't really comment on that, but I think the information is never enough.

MARK KENNY:

Okay. Let's have a question from Peter Phillips.

QUESTION:

Dr Wirz-Justice, Peter Phillips, one of the directors of the National Press Club. Congratulations on your award and welcome to the National Press Club of Australia. I hadn't realised that I'd be sitting here listening to reflections on circadian rhythms and the effect on life, but it takes me back to an earlier incarnation in my own life when I worked for a number of years in a little settlement a long way to the south of here in the island State of Tasmania, and in a mining community.

And in that mining community there was great concern evidenced on an annual basis by the management of the central industry in the town, which was a major mine, because the behaviour through winter months - the behaviour, particularly, of the workforce - of the men in the town - was clearly influenced by the fact that the men would spend large periods of time underground. Eight hours per day, travelling to their place of work and travelling away from their place of work, would bring it up to about nine hours.



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And, of course, in the time when the proportion between daylight and dark in an average day - through the days from the latter part of the autumn through to the early part of the spring, about 15 hours of darkness and nine hours of daylight - and through those darker months, social behaviour incidents of alcoholism, incidents of domestic violence, absenteeism - I wonder whether that - I don't know that the not particularly sophisticated view of the mine management, which was that it related, principally, to alcoholism or to alcohol consumption, whether it might have stood the - some access to the research, which you've done and the findings that you've made, in relation to just the exposure to daylight and does that mean there, perhaps, should be more interaction between industries such as mining and other industries, where there is deprivation of, or lack of exposure to, light?

ANNA WIRZ-JUSTICE:

Very good question and, by chance, the President of the ASMR happens to be in the same field of chronobiology and sleep research, and she does a lot of consulting to the mining industry and works on shiftwork schedules.

But you are absolutely right. What you're talking about there is similar to what one finds in northern countries, Sweden, Scandinavia and Alaska. But they go to work in the dark, they are in the dark and they go home in the dark. They're, sort of, living on a 24 hour night, like in winter in Antarctica and their rhythms, probably, are pretty poor. We know that in Finland in winter, the drinking, which is already the natural antidepressant of that country, goes up higher. They drink much more in



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winter. It's a self-treatment but it doesn't work very well.

And there is a lot of light therapy and light installations in these northern countries. For example, you can go to cafes in the centre of Helsinki, which has coffee, croissants and light box on the table. I've even seen, in Umea in Sweden, the bus stops have got light walls so that people, while waiting for the buses, maybe they wait a long time, they get their therapy. This research has direct connotations for a lot of the workforce.

MARK KENNY:

Some people would say my colleague, Mr Phillips, stayed in the dark because he moved on from underground mining to diplomacy. But the next question is from Mark Metherell.

QUESTION:

Mark Metherell from the Consumers Health Forum of Australia, doctor. Thank you very much for your very interesting speech and congratulations on the award. My question follows a little bit on from the one before, and that is we are living much more in a 24/7 world these days, with many more jobs, retail, you name it. People working, now, at night, much more, I think, in the west than would have been the case 30 or 40 years ago. And, arguably, younger people are staying out late, going to bed later than, say, 40 or 50 years ago. Has that impacted, in any measurable way that you're away of, on either health, or mental health, in the western world?

ANNA WIRZ-JUSTICE:

I can't give statistics. This is something that we in chronobiology think. There is a very close connection



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between the lack of fitting our lives to a natural day and night cycle and having stable rhythms. The fact that we go to bed much later, that we don't get enough light, one measures - if one actually measures how much light people get in our society, it's not very much above - a thousand lux we think is a sort of therapeutic level.

And if people don't get enough light, their rhythms are not very well synchronised and the side-effects are mood, performance, et cetera. And long-term, we can't - we don't, really, know the data but, I think, these hints of sleep debt - because people go to bed late and they still have to get up early - the sleep debt, correlating with obesity and with diabetes, that's something that people hadn't thought of before. They thought it was lifestyle in terms of other things but sleep was forgotten.

One of the problems of our times as well is that we're all sitting at our iPads in bed and the teenagers have all these gadgets in their bedroom. The new LEDs are blue. The backgrounds of the computers are blue. I told you that the special photoreceptor is sensitive to the blue wavelength. We did a study showing that just a couple of hours sitting in front of a blue computer screen instead of another colour, more in the green, could shift the biological clock an hour - shift sleep tendency by about an hour. So the late teenagers are getting even later by fiddling away with their various gadgets.



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There are simple ways - well, no. There are no simple ways of getting teenagers not to do this but what you can do is change the colour of the screen. This is one of the - yet another simple result from chronobiology research, shifted - there are programs on the web for shifting the background colour to orange. We're also doing a study with late teenagers, making them wear orange sunglasses from 5 o'clock in the evening, and that is sufficient after a week, they don't evening light, which shifts the rhythms later, they get darkness, as it were, for their biological clock. They get sleepier earlier, their melatonin rhythm shift earlier. So - I mean, I don't like to think they like wearing these groovy orange sunglasses but, you know, again, very simple techniques that, if we had some designers and made them acceptable to teenagers, everybody might be wearing them.

QUESTION:

Doctor, what would you regard as the ideal working day? What sort of hours, for examples, were you looking for in the campaign about school?

ANNA WIRZ-JUSTICE:

For you or for me?

[Laughter]

QUESTION:

Ah let's ...

ANNA WIRZ-JUSTICE:

Yes. Well, the ideal working time, again, should we order - or could we adapt an individual's chronotype to his working time, so that an early bird doesn't have to go to work on the night shift. I don't want a doctor, who's an owl, looking at me at 5 o'clock in the morning



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because I don't think he or she would be terribly efficient. They might make more mistakes. And one possibility is to take a person's chronotype and find their optimal working schedule. This is not possible in every industry, of course, but a little bit of leeway, a little bit of flexitime, which is possible in many professions, is a good thing and makes people happier and they work better.

MARK KENNY:

We will have the opportunity, if there are a few people in this learned audience that would like to ask a question. If they indicate their preference to my young colleague Hannah there alongside the chief executive and we will get a microphone to you. But the next question is from the chief executive Maurice Reilly.

QUESTION:

Thanks again. Doctor, welcome to the Press Club. Are there any adverse implications of being in, like the long days, too much sunshine in your research? And if I may be permitted a second question, my wife thinks I snore. I wonder whether, in your research, whether there were any golden rules or, perhaps, solutions that I could offer her.

ANNA WIRZ-JUSTICE:

Now, to be diplomatic, I'm not a sleep doctor. There is a great tradition of sleep medicine in Australia that does the diagnoses of sleep apnoea. The treatment of sleep apnoea was developed in Australia and that has been a major milestone, creating our field, in fact.

And, without going into serious diagnosis, middle aged male and snoring is the first step to diagnosis of sleep apnoea and maybe one could do something about it.



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There are lots of various treatments. Not all of them work very well but the person next to you would really appreciate it.

[Laughter]

The adverse affect of day length. Well, what I'm talking about is light without the UV. So we're not talking about UV. All our light therapy goes through the eye, but it's not UV. All the lamps, the good lamps, are UV protected. So we're not talking about this aspect of the visual of the spectrum. I don't know what's a problem with the long day. I can't wait to get back to summer.

MARK KENNY:

Warwick.

QUESTION:

Hi, Anna, I'm Warwick Anderson from the National Health and Medical Research Council. I wanted to thank you first for your comment about left field research, the odd idea that gets connected up in a creative way and we try and remind our peer reviewers that NHMRC about this. We have an award each year which we call the Marshall & Warren award to remind everybody that Barry Marshall came from very left field for very important therapeutic effects. I want to ask you a little bit more about the quality of light. Is there a growing industry understanding about the type of light we have in our workplace that affects sleep? I'm aware that many of the audience work 14 hour days in laboratories, not all of those - don't you all - not all of those are -

ANNA WIRZ-JUSTICE:

Only?



QUESTION:

Well, and of course, thinking of jetlag, we think of how planes light up inside as they go and my favourite, is there any affect of wearing groovy sunglasses that block out most of the light on your sleep pattern? Thank you.

ANNA WIRZ-JUSTICE:

Well, let me begin with a little thanks to the Swiss National Science Foundation because they have been supporting my research for the last 30 years and when I came back from the NIMH to Switzerland and introduced light therapy to Europe, you know, most of my colleagues and most people thought it was a bit crazy, but the Swiss National Science Foundation said, well, let's try it out for one year and they went on for 30 years which is great. Now, what was the second question about?

QUESTION:

The kind of type of light.

ANNA WIRZ-JUSTICE:

Yes, well, when light therapy developed for winter depression, a whole cottage industry came up of making light boxes and selling them because all they need are electrical standards. Most of them don't need to go through clinical trials. They're not medical devices in that sense and so, you know, some of the light boxes are groovy, some of them are not very - they're not tested.

Some companies immediately made blue lamps after the discovery of the blue sensitive photo receptor and put them on the market and they're tiny little things and they're horrible glare. Nobody has really done any studies to show that blue is better than full spectrum



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white. Blue has some negative possibilities for the cones. So, you know, there is, on the one hand, lighting companies come to our meetings because they want the newest - the biological effects of light is now in every brochure from Phillips to Ozram to all these big companies.

They have developed ceiling lighting for nursing homes with simulations of lovely days, the spectra, the lighting, but yes, that is a very important development and I'm saying this is what we should be doing, but there is a little bit in between and that's quite expensive and that's called clinical trials to show that this idea in reality actually helps someone and the lighting companies are not doing that and we have to struggle to get money to, you know, to do these trials of our new lighting devices, but I think it's for workplaces, for schools, for hospitals, the intensive care unit, for example, which is usually horizontal lighting, they should have day night difference so that the sleep quality improves because that's important for recovery. There is a lot to be done, I think. I think our research has really opened up an entirely new field.

MARK KENNY:

We have a question towards the back.

QUESTION:

Hi, my name's Morgan. I study at the ANU. I was wondering if you could tell us since so many people in Australia are chronically sleep deprived or have a chronic sleep debt, could you tell us whether napping is something that's helpful and have you done any research on that?



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ANNA WIRZ-JUSTICE:

I haven't done research on that except practically.

[Laughter]

But there is a great deal of research trying to find out what are the optimum times and durations of nap in order to maintain performance, this is for the work field, very important and it seems that about 10 to 20 minutes of napping - and if you call it a power nap instead of a siesta it's much more politically correct - 10 to 20 minutes is great because you don't have that sleep inertia that occurs if you sleep for an hour. You wake up and feel groggy and hopeless and you're useless for the rest of the day. So, if you're going to have a power nap, do it short and many industries, many companies, are trying to get rooms, quiet rooms, where people can go and have their nap, not just sit at their desk and fall asleep, but have a proper nap.

If we look back at animal sleep and if we look at the development of human sleep, animals are polyfasic. They sleep in little bouts all the time and babies and old people sleep in several bouts. We seem to think that we should sleep in one tiny squashed eight hour block. Actually, in the 17th century, we used to sleep much more broken sleep. We had a first sleep. People woke up in the middle of the night. They went and visited their neighbours, then they went back home and had another bout of sleep.

One little squashed eight hour sleep is not normal. So naps during the day and perhaps two bouts of sleep in the night, I tell that to people at the senior universities



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in Switzerland, don't worry so much. Polyfasic sleep is normal, and I think that when you know more about sleep, then you stop worrying that, please doctor give me a pill to put me to sleep.

MARK KENNY:

Here's the next question.

QUESTION:

Thank you very much. Marcel Stutz, I am the Swiss Ambassador here. I would like to thank you first of all for your talk that was not only about cold feet and cold hands, but as well delivered with a warm heart. As the Swiss Ambassador, I am especially glad to hear that there is something like a gloch clock gene which we may build into something, but that brings me to my question. Do you see a function of light therapy for people who do a lot of travelling? I mean most of us, I presume, are travelling to and from Europe a lot and most of us suffer then from jetlag and I just have a little bit of a problem in fazing that in.

When I go to Europe I'm supposed to work the next morning and be there and when I come back here I'm supposed to work here again and be here. Fifty years ago, we used to travel on ocean liners and jetlag wasn't an issue, but it took us two months and I simply don't have that time.

ANNA WIRZ-JUSTICE:

Thank you so much. When I left New Zealand I went on a boat. It took five and a half weeks and the sky changed and there was no jetlag, but nobody has that amount of time any more. Of course, chrono-biologists are the official timekeepers for jetlag, how to get over it, but it's not that easy because each of us has a



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different inner clock, as I say, where you are here, not everybody is at the same time zone, even if they're all sitting in this room and when we move across time zones, some of us adapt when we get there and don't adapt.

We have our little rules and there are websites where you can say if I'm going six time zones east or nine time zones west, put on your orange sunglasses in the evening and make sure you're outside in the light in the morning. There are little recipes and I try and do it and then I take melatonin somewhere in mid Atlantic or something and hope that that's going to work.

Again, if you do it at the wrong time, you will shift yourself to Japan instead of LA.

[Laughter]

We would love to have simple recipes, but it has to be tailored to the individual. I found when coming from Europe to down under, because we're nearly 12 hours out of phase, the best thing to do is to go outside for the whole day and just to squash your clock into that time zone with light, but it might not work for everyone who has to work the next day.

MARK KENNY:

Thank you, doctor. Time has caught up with us, but thank you very much for your appearance today.

[Applause]



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We hope if you get the chance to come back to Australia again, despite that terrible time difference, you will come back and see us again. There is a membership card.

ANNA WIRZ-JUSTICE: Thank you.

MARK KENNY: Thank you very much.

ANNA WIRZ-JUSTICE: Time for tea.

MARK KENNY: Yes.

* * END * *

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