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| **Transcript

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## Associate Professor Genevieve Healy

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### Description: Associate Professor Genevieve Healy discusses research on understadning sitting habits, how this influences our health and wellbeing, and the adjusting the behaviour of desk-based workers.

**MADONNA KING:** And welcome back.  We are certainly on the home stretch now.  Before we get started this afternoon, though, I wanted to welcome back our digital illustrator, Devon.  She will be drawing our afternoon speakers' key takeaway  and  we will cross to her after our next address. And that is from Genevieve Healy, the principal research fellow at the School of Public Health at the University of Queensland.  Her research focuses on understanding how much we sit and how this influences our health and wellbeing.  As well as the feasibility and acceptability of reducing this behaviour in key settings and populations with a particular focus on desk‑based workers.  Genevieve's has influenced policy and guidelines regarding the importance of reducing prolonged sitting time, and she works with multiple industry and partner organisations to importantly translate her research into practice.  And that's the key, isn't it.  Please join me in welcoming Genevieve.

**GENEVIEVE HEALY:** Hi everyone.  Thank you for the opportunity to discuss about addressing excessive sedentary behaviour in the workplace.  This is a behaviour that's been identified by SafeWork Australia as an emergent work health and safety issue.  But first in the spirit of reconciliation I acknowledge the traditional custodians of country throughout Australia and the connections to land, sea and community.  I pay my respects to their elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

I have broken up this talk into two main parts. So in part one I will provide the context and background into why excessive sedentary time has now been acknowledged as an emergent work health and safety issue, and then in part two I will discuss potential solutions for supporting workers to sit less and move more, including the Be Upstanding program.  And, of course, I encourage you to regularly change your posture throughout this talk today, as well as all the talks in the virtual conference.  Hopefully you have been doing that already.  And try to also slip in some stretches and some simple resistance activities like calf raises or half squats.

So through computerisation and modernisation we've helped design activity out of our daily lives, including at work.  And common work tasks that used to involve movement such as filing are now done electronically.  And with a major disruptor in place by the coronavirus pandemic, we are also now doing more of our meetings virtually, meaning potentially even more time spent in front of the computer.

The potential impacts of this from a health and safety perspective were highlighted in 2014 by Leon Stroker and colleagues, who suggested that the excessive occupational time common in the modern workplace was not a safe system of work.  So specifically the authors contended that the systems of work commonly observed in contemporary offices: A, demonstrate a high likelihood of an excessive sitting hazard; B, that the degree of harm associated with this hazard is likely to be substantial; that the evidence for this is now widely known; that there are available ways to minimise the risk; and the cost of these strategies are proportionate to the risk.

Building on this concept, along with a rapidly emerging evidence base and associated media attention on the links between high levels of sedentary time and poor health outcomes, SafeWork Australia commissioned an evidence review.  And the conclusion from this review was that it was time to consider the growing hazard of occupational sitting.  And in 2016 sedentary work was acknowledged as an emergent work health and safety issue.

A lot of research on sedentary time and interventions addressing workplace sedentary time have been published in the seven years since the Stroker article, identifying that excessive occupational sitting common in the contemporary workplace was not a safe system of work.

So where is the evidence now at?  The first point was that there was a high likelihood of an excessive sit hazard.  This observation has been now confirmed in numerous studies showing that desk workers typically spend 70% to 80% of their workday sedentary.  Notably, as is the case with the data presented here, which is from our Stand Up Australia program of research, more than half of the sedentary time is accrued in prolonged unbroken bouts of 30 minutes or more. And this prolonged unbroken sitting pattern is of particular concern, given the increasing evidence on the links between this behaviour pattern and indicators of poor health, including premature mortality.

Work sedentary time accounts for the majority of a desk worker's daily sedentary time, and notably it's not just desk workers at risk, over 80% of Australian workers report at least some level of occupational sitting, and about half report sitting often or all of their time at work.

So why does this high exposure to excessive sedentary time matter?  Well, the impact of sedentary behaviour can be considered in two main ways.  Behaviourally, if you're sedentary you are displacing time that you could have spent in other behaviours that might have more health benefits, including light intensity activity.  Physiologically your muscles are relatively inactive.  And this leads to both metabolic, vascular and musculoskeletal impacts.  And this includes reductions in back muscle strength and substantial increases in low back intervertebral disc pressures.  And long term this can lead to several impacts on health.

So this table shows the link between high levels of sedentary behaviour and risk of chronic disease and the level of evidence for these relationships.  As you can see, there is now strong evidence for dose response association between sedentary behaviour and all calls in cardiovascular disease mortality and incident cardiovascular disease.  The limited evidence from the other factors is not necessarily because there isn't a link, but rather because the evidence is still accruing, given that sedentary behaviour is a relatively new behaviour being measured.

Reducing sedentary time is particularly important for those who are physically inactive.  And, ideally, we want to both reduce prolonged sedentary time and increase moving time.  Hence the dual messaging that you will hear of "sit less and move more".

I was involved in a review for the Canadian 24 hour movement guidelines which looked at other health related outcomes, and this overview of reviews found that high levels of sedentary behaviour are unfavourably associated with cognitive function, depression,  function and disability, physical activity levels and physical health‑related quality of life in adults. Whereas reducing or breaking up sedentary behaviour may benefit body composition and markers of cardiometabolic risk.

Notably, the certainty of evidence for these outcomes was low to very low, and like what we saw for chronic disease more research is required.  However, given the consistency of findings across multiple studies and populations across the lifespan, as well as the increasing evidence based on the mechanisms that help explain these relationships, I think it is reasonable to say that excessive sedentary time is harmful.

Since the original article in 2014 I think it also can be strong argued that the evidence and the health impacts of too much sitting are becoming increasingly well‑known amongst the general population, including employers and employees.  Specific recommendations to limit and break up long sedentary time have now been integrated into public health guidelines around the world, including Australia, and multiple references to the impacts of prolonged sitting have also emerged in popular culture, in shows like 'Brooklyn Nine‑Nine'.  However, although the level of knowledge is increasing, as I flag later it is still really important to include an educational component when looking to change prolonged sedentary time.

The final couple of points in that Stroker article is that there are solutions available to reduce excessive sedentary time and these solutions can be low or no cost to the employer and employee.  They can also be really simple, such as standing to take a phone call or deliver a meeting; taking the stairs instead of the lift; and integrating stand and move breaks into meeting agendas. But it is important that what we replace excessive sedentary time with doesn't expose the worker to other risks.  This is particularly relevant for replacing sitting with standing, as there has historically been links to prolonged standing and adverse health outcomes, including lower extremity venous disorders.  Dr Conan conducted two systematic reviews with meta-analysis examining the associations of standing with musculoskeletal symptoms.  One of them focused on evidence on laboratory-based studies, and the other focused on the epidemiological evidence.

The laboratory review included 26 articles from 24 studies looking at musculoskeletal symptom development during prolonged uninterrupted standing, which they classified as standing continuously for 20 minutes or more.  Most of the articles looked at low back and lower extremity symptoms.  They reported that clinically relevant levels of low back symptoms were reached after 71 minutes of prolonged standing with this shorter to 42 minutes in those considered pain developers.  And given that it's not always known whether someone will develop musculoskeletal symptoms or not, the authors recommended limiting prolonged standing to no more than 40 minutes at a time.

The second review examined the evidence from 50 articles reporting on the associations' occupational standing with musculoskeletal symptoms, with the majority of the articles looking at low back symptoms.  They reported in their meta-analysis that substantial occupational standing time, which they classified as four hours per workday, was associated with a higher occurrence of low back symptoms for the pool observation ratio of 1.31.

The authors tentatively concluded that the evidence suggested that substantial occupational standing was associated with the occurrence of low back and inconclusively lower extremity symptoms, but there may not be such an association with upper extremity symptoms. With a need for more high-quality longitudinal studies noted.

Given this evidence showing health impacts of prolonged sitting and prolonged standing, coupled with the benefits of regular movement breaks, the recommendations now focus on not trying to find the perfect posture, but rather the importance of listening to your body and regularly shifting between postures.  Or, as we like to say, the best posture is the next posture.

So what are some of the potential solutions for supporting workers to sit less and move more?  Before we look at the evidence around intervening on workplace sedentary time, it's important to highlight some peer considerations around this behaviour that impacts on the types of intervention approaches and strategies used.  So sedentary behaviour is habitual and it often occurs subconsciously.  That means it's likely that some form of prompting will be needed when intervening on the behaviour, and indeed prompting has been widely used as an intervention strategy.  This can be relatively simple, such as using posters or fridge magnets, or time‑based such as computer prompts, or it could be more individually tailored such as the use of wearables or text messaging.

The second point is that there is multiple influences on sedentary behaviour and this influence is also contextually driven, with the context varying by age and life stage. And as we have seen so vividly demonstrated through the pandemic by broader societal changes.  Understanding that there are multiple influences on sedentary behaviour is critical to be able to appropriately intervene and achieve sustainable change.  So, for example, an office worker's sedentary time is dependent on their job role and job tasks, their physical environment such as access to equipment that allows them to be sedentary while working, and the culture in their workplace and the extent to which less sedentary behaviour and more movement is normalised and supported.

Importantly, sedentary behaviour is okay to do sometimes.  That is, intervention should not target elimination of this behaviour but rather approaches need to be nuanced to be able to support more movement, more often.  We can see this play out in the targeting of prolonged unbroken periods of sedentary behaviour in health coaching and associated intervention messaging.

And the final consideration is that the evidence based around the health impacts of too much sedentary behaviour is relatively new and still emerging, and many people are unaware of the health impacts or perhaps the scope of the health impacts.  As such an educational component can be an important part of the intervention strategy.

There have been multiple different types of approaches that have been used to target workplace sedentary behaviour, but they can be broadly categorised into three types: Behavioural interventions that target and support the individual using tools such as mobile apps, activity trackers and educational workshops; environmental interventions that involve structural changes such as activity permissible work stations or centralised printers, or even more broader changes such as building redesigns; and multi‑component interventions, which involve a mix of organisational, environmental and behavioural components.

Do these approaches work?  Well, the short answer is yes.  There have now been multiple studies demonstrating that sedentary behaviour can be reduced in the workplace, and that intervention approaches to achieve this are acceptable and feasible to implement.  Multi‑competitive interventions targeting the multi‑influences on behaviour, and including organisational support for change, along with a strategy targeting the physical work environments such as the use of sit‑stand workstations typically achieve the greatest reductions in sedentary time.  Notably, integrating workplace sedentary reductions interventions has also been shown to be a cost-effective primary prevention strategy for cardiovascular disease, which given the rates of chronic disease in Australia further adds to the business case for addressing sedentary time.

But does change in behaviour decrease musculoskeletal symptoms?  In 2019 Parry and colleagues published a systematic review and meta-analysis examining the effectiveness of workplace interventions to increase standing or walking on decreasing musculoskeletal symptoms in sedentary workers.  Their primary outcome of self‑reported intensity or presence of musculoskeletal symptoms by body region, and the impact of musculoskeletal symptoms such as pain‑related disability.  They found 10 studies, the majority of which were randomised control trials or cost of randomised control trials.  The interventions themselves targeted changes to the physical work environments such as provision of sit‑stand or treadmill workstations, an activity tracker for use in individual approaches, and multi‑component interventions with no study specifically targeting only the organisational environment found.

The authors concluded that the current evidence did not show that interventions to increase standing or walking in the workplace reduced musculoskeletal symptoms among sedentary workers at either the short, medium, or long-term follow‑up.  However, they noted that there was only limited evidence available and the quality of evidence was low or very low, largely due to the study design and small sample sizes.  They also noted that although the results of the review were not statistically significant, some interventions targeting the physical work environment are suggestive of an intervention effect.  The authors highlighted the need for large, long-term cluster randomised control trials recruiting participants with musculoskeletal symptoms at baseline.

So, in summary, stay tuned.  The focus to date has been on understanding behaviour change in general working populations. As the evidence base builds on more diverse populations and that's powered on outcomes other than behaviour, we will have more certainty on these relationships.

One low‑cost/no‑cost solution available to support work teams now is the free online Be Upstanding program.  So Be Upstanding is a team‑based program designed to support desk-based workers to sit less and move more for their health and wellbeing. Uses a train‑the‑champion approach to help workplaces raise awareness and build a supportive culture in order to create sustainable change.  And the program has been based on over a decade of research into what works to support workers to sit less and move more.

We developed the program in collaboration with policy and practice partners from across Australia, including SafeWork Australia and Comcare, as well as state‑based partners: Queensland Office of Industrial Relations, Vic Health and Healthier Workplace WA. We went live with the toolkit in September 2017 and collected data from over 100 workplaces, and we used that data from these early adopters to modify the toolkit to make it ready for a national implementation which is currently ongoing. The program continues to improve through a product development cycle based on the feedback from these multiple stakeholders.

The Be Upstanding messages are to stand up, sit less and to move more.  And that's really based on the evidence that I've been presenting to you today.  So it's not about standing all day, but rather doing that best posture is the next posture.  Regular shifting between postures and listening to your body.  It's also not just about sit‑stand desks.  Rather, it's about raising awareness and creating that supportive culture for change across the whole team.

The intervention targets highlighted in the program are to aim to get up at least every 30 minutes and aim to spend 50% or less of your workday sitting.  And the point is to work gradually towards those targets.  And these were considered reasonable, in light of the evidence base.

Be Upstanding is delivered by a workplace champion and this can be anyone in the workplace, but ideally it's someone who can communicate both up and down, is passionate about health and wellbeing, and is confident to be the role model for change.  And the program uses a train the champion model to support the champion to take up, deliver and evaluate the program using that familiar plan‑do‑review format.  The champion is guided step‑by‑step through this process with a toolkit providing all the materials and resources that are required.

Staff input is critical to the success of the program.  And as part of the planning phase staff are asked to complete a needs assessment.  This provides the champion with information on the team's current self‑reported levels of sitting, standing and moving behaviours, as well as what they would like to do.  So their desired levels of those behaviours.  And Be Upstanding aims to bring the desired closer to the actuality.

The needs assessment also captures what staff perceive as barriers to being able to sit less and move more, as well as strategies that they are currently doing.  And this data is used to help inform the staff workshop.  Here the aim is for the whole team to collectively decide on three strategies to sit less and move more that best suit them as a team.  And this participative approach is intended to build team cohesion and a supportive culture for the change.  Teams are encouraged to choose strategies high on the hierarchy of control if possible, so using elimination strategies such as voice recognition technologies, or substitution redesign strategies such as having standing meetings or centralising printers and bins.

By teams choosing how they are going to be upstanding, it recognises that every workplace is unique and the team are the most informed about what is going to work for them.

Notably, Be Upstanding is suitable for teams of desk space workers no matter where they are working, with a program including tips and tools to sit less at home as well as tips for the home‑based off computer workstation.  Indeed this flexible and participative approach of choosing strategies meant that teams were able to readily adapt their strategies when the pandemic and associated changes in working conditions hit, while our current workplaces are able to choose strategies and approaches that suit the hybrid way of working, that many of the teams are experiencing, or to account for those unexpected lockdowns.

So what are some of the strategies that our work teams are choosing? Well, there has been a wide range of strategies chosen.  Here is just a few that our champions have told us have had good uptake. Including, blocking out lunchtime to exercise, standing for phone calls and using toilets that are on a different level.

Since going live in September 2017 we've had over 800 workplaces and over 920 champions unlock the toolkit, exposing over 156000, staff to the sit less move more messaging. We have had participation from across Australia and from across all industries, from small to very large.

We are also seeing benefits of it from a behavioural perspective.  So you can see changes in the program at the start was 79% of the time a self‑reporter spent sitting, which is aligned with what we saw earlier, and they are reducing that by 8% which is about a 40 minute per day reduction.  And, importantly, we are seeing those reductions in that risky sitting, which we classify as sitting for prolonged periods of 30 minutes or more.

In terms of musculoskeletal discomfort, we used the modified version of the Nordic questionnaire to ask participants about their musculoskeletal discomfort. Where they are asked to give a score from 0 to 10, where 0 is "no discomfort" and a score of 10 is "extreme discomfort".  And you can see the levels of any discomfort are really high, around 80%. But in these interim findings we are seeing reductions in all three areas, with nearly a 15% reduction overall.  So really promising early results.

As part of the needs assessment champions are also asked to complete a workplace audit.  So this is intended to help the champion assess the current workplace environment culture and related policies.  To help them support the staff to be upstanding.  And really excitedly we are helping to capture the data which is helping us to understand what supports are available before they start Be Upstanding and which ones that they don't have.  And this helps us understand the strategies that work teams are choosing, but also helps us and others design our interventions to promote and modify the low‑cost strategies or easy wins that workplaces could take up to support their teams so sit less and move more.

So here is some of the findings from the 291 champions that have completed this audit so far, and these are the easy wins that were done by less than 50% of our responders.  So you can see here some of the examples: scheduling tasks and breaks to encourage more movement, or having policies or procedures that allow staff to be more active such as flexible work hours.

So where to next?  As you have hopefully seen there is continuing to be rapid advances in the evidence space regarding excessive sedentary time at work and solutions to support workers to sit less and move more.  And these are rapid advances that have occurred in large part because of the collaborative partnerships between researchers, industry and policy and practice partners.  And it's critical that these partnerships are built and expanded on.  We still need more high-quality evidence, and we need to continue to generate evidence from real world implementation of sit‑less‑move‑more solutions from a diversity of work places and workers, including those with existing health conditions.  And we need to understand in more depth the variations and change.  Who does the interventions work for?  Who doesn't it work for and why?

So just finally, I just want to conclude with a couple of takeaways. Firstly that excessive sedentary behaviour is linked to several poor health outcomes, including musculoskeletal' disorders, and given the high rates of exposure in the modern workplace to this behaviour it should be considered as a health hazard to be addressed.  There is a rapidly emerging evidence base demonstrating that there is many effective solutions available, including Be Upstanding, and creating workplace environment and organisational systems that support workers to sit less and move more are a key part of the solution to better manage the risks associated with excessive sedentary time and improve the health and wellbeing outcomes for workers.

So thank you very much for this opportunity and for all of the people that contribute to this evidence base and help support workers to sit less and move more.

**MADONNA KING:**  Thanks Genevieve Healy, Associate Professor at the University of Queensland. And, Genevieve, we've got a few questions and a few minutes, so let's get through them.  The first is from me.  How can some of these strategies apply to industries such as, you know, occupational drivers, 24/7 control rooms?  Is there research underway into this space?

**GENEVIEVE HEALY:** Yes.  So we started our research with, you know, an easy population, to see if we could achieve change in desk space workers, primarily because there are a lot of them and that the risks are seen.  But there is work underway, work done by Mick Gilson at the University of Queensland on his truck drivers, for example. And that's where you are looking, more at those higher order changes; the policy changes about the breaks that can be taken. And then encouraging workers when they are on their breaks to be more active.

**MADONNA KING:** Thank you.  Lani is interested in the positive effects for workplaces you found in your study.  In some of the workplaces that have been delivering these programs for a while, have you seen benefits and what are they?

**GENEVIEVE HEALY:** Definitely.  So there's ‑ I think there's a lot of benefits in terms of their behaviour, but what we love hearing about is the impact on the culture changes.  That people feel more connected. And this program, our national implementation trial happened ‑ it started in June 2019 and then the bushfires hit, and then the COVID‑19 pandemic hit.  So we've had this really unique opportunity to understand what's been happening at workplaces during this time. And the program ‑ because it's about connecting people and supporting them  to be more active ‑ and which is, you know, quite an easy thing to achieve ‑‑

**MADONNA KING:** Yes.

**GENEVIEVE HEALY:** Without achieving that cultural change, that long term support and connectedness are some of the stories that we are really like hearing and how just ‑ how they continue to build on those strategies throughout their time.  So we are now up to interviewing some of our participants one year on since they first started their strategies.  And a lot of them have gone on to make physical changes to their workplace. So they might have invested in sit‑stand workstations for example, or they might have integrated policies into their workplaces. Which is exactly what we were aiming for with the study.

**MADONNA KING:** Thank you.  Kerry asks, anecdotally we hear that people who mix up sitting and standing report being more alert and having more energy at the end of the day.  Has any research found that?

**GENEVIEVE HEALY:** Yes.  And I didn't present all of the findings because I could have gone on for ages, but we are definitely seeing that just from a self‑report perspective in our Be Upstanding studies that there is beneficial impacts on alertness, energy levels, creativity, productivity.  These are all ‑ so it's really exciting to see those sort of things.  And I think a lot of people find that themselves, if they are mixing it up they feel better. Or you can think of the reverse of that. If you are sitting for long periods of time you feel really sluggish and slow.

**MADONNA KING:** Yes.

**GENEVIEVE HEALY:** But definitely seeing that in our data coming through.

**MADONNA KING:** Thank you.  Andrew asks, in a manufacturing environment where people are standing up for long periods, is it a valid solution to have these people sit down occasionally?

**GENEVIEVE HEALY:** It's exactly right.  And that's what the systemic review and meta-analysis showed, that the recommendation not to be standing for more than 40 minutes over a prolonged period of time as well to help prevent ‑ so there should be those options for those regular changes in posture.  So, yes, sitting. Yes, standing. But also moving and integrating those active breaks in as well is really important.  And when we are looking at our chronic disease studies it is the active breaks. So walking and putting in those simple resistance activities. If you can add those into the story that's even more beneficial.

**MADONNA KING:** To Luca's question, is there a relationship between sitting and psycho‑social hazards. For example low job control, decision latitude, fatigue, high job demands?

**GENEVIEVE HEALY:** Yeah, that's a great question.  It's one that we are looking at in some other research and so I guess stay tuned, because some of that ‑ I won't answer that because I don't know the evidence fully on that.  So stay tuned and I'll get back to you and look that one up.

**MADONNA KING:** That would be wonderful.  And when we send out everyone's ‑ or the access to all these keynotes will be available in about a week across the portal and we will include your answer there.  Thank you.  A final question though.  Our symposium is built around safety by design.  What does that mean to you?

**GENEVIEVE HEALY:** Safety by design is designing a workplace where people from a sedentary behaviour perspective have the ability to be able to change their postures as they like to do their work.  So to be able to do the best posture is the next posture, because the work tasks enable them to do it, the culture in the workplace enables them to do it, the environment enables them to do it.  And they have the education and knowledge that enables them to do it.

**MADONNA KING:** Genevieve, thank you.

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