CHO SEMINAR #4 – August 2007

CHO August 1 Urbanisation and Planning

Presenters and their subjects:

“Urbanisation and Health.” Mr Allen Kearns, Deputy Chief, CSIRO Sustainable Ecosystems, and Sustainable Cities Research Leader,

and

“Planning and Health.” Ms Jacqui Lavis, Deputy Chief Planning Executive and Director Planning Services Branch, ACT Planning and Land Authority.

Allen Kearns

Many people at this seminar are academics. I like to think of myself not as an academic, but what some people call a pracademic. That’s somebody who likes to be at the interface of bringing research knowledge into practice, and that is what I want to discuss here today.

I am an environmental scientist. From my perspective, urbanisation and health is a complex labyrinth of interacting social, environmental and economic factors. There are many views on this subject but I am going to present just one of them here – something for you to consider.

As for many complex social-environmental problems, there are no easy answers to questions about urbanisation and health. There are multiple, completely valid views. There are very different disciplinary approaches. And I believe there are very few clear scientific truths about complex systems when compared with the science I experienced in my early career as an environmental chemist working on contaminated industrial sites. That was intellectually challenging, but not as intellectually complex as asking and answering questions about urbanisation and health.

I’m going to present some different ways of looking at complex problems like urbanisation and health. I’ll identify some of the barriers to the uptake of new knowledge about urbanisation and health and I will point to some pathways to change in how we design and develop sustainable and healthier cities.

It has become clear to me, over the last five to ten years in particular, that urbanisation is a dominant force in global change. The form of rapid urbanisation now taking place in developed countries like the USA and Australia greatly increases resource use per person and enhances greenhouse gas emissions. It affects the health of people for good and bad on a global scale because of the global trade in urban resources such as energy and food. Now this is clearly a contestable perspective. Some will see climate change as a dominant force affecting the planet; others will see disease and security issues as causing the greatest change for people.

I see the reach for urban resources and the growth of cities as a dominant force. Other factors such as climate change and habitat fragmentation are symptoms or consequences of rapid urbanisation, population increase and rising resource use per person. If you consider the light energy emitted from the five largest cities in Australia, as seen from space at night, and then compare that with the energy from cities in the northern hemisphere, you realise that we are just an outlier on the margin of the world's urbanisation. Yet our natural resources connect us to global urbanisation. We provide the substantial flows of energy and materials that help transform the shape and economy of Asian cities. This energy flow also enhances the migration of people from rural areas to Asian cities where they produce the goods that are then exported to urban consumers in other countries - like us in Canberra, Australia.

When I read the *Sydney Morning Herald* on weekends I am struck by just how many articles there are about the complexity of life in cities. The stories are written mostly about Sydney, our largest city. It's the place where I grew up, went to school and university and where I still visit my ageing parents who have happily lived in the same industrial suburb of Mortdale for 60 years. What's interesting is that the stories about energy, water, climate change, public health, transport problems and the lack of affordable housing that grab the headlines today have their counterparts in the Sydney suburbs of the fifties and sixties.

I can certainly remember in the fifties there were many blackouts, water shortages and sewage problems after heavy rains. These were and are the types of complex issues that are part of the fabric of urban life. So what we are faced with now is a constant adaptation to the pace of urbanisation and the pressures of globalisation. People are forcing themselves to adapt and to confront these issues.

Now some of us read other literature and other newspapers. I have a colleague named Katrina Proust at the ANU who has been reading the *The Casper Star-Tribune*, as shown here. I like its banner. It proudly proclaims itself as 'Wyoming's Statewide Newspaper'. Now I had the good fortune to spend ten years in California, though I didn't get to Wyoming, but clearly the journalists in Casper keep a keen eye on science and technology for they reported some very interesting research findings about the economic impact of obesity on urban fuel consumption.

The researchers showed that small increases in individual body weight multiplied by large numbers of people riding in cars produces a huge amount of demand for fossil fuels. That fuel has to come from somewhere and it produces greenhouse gas emissions. They calculated that every extra pound of body weight needs 39 million additional gallons of petrol per year in the USA. The weight of the average American has increased by 24 pounds or 11 kg between 1960 and 2002. This is 936 million gallons more fuel consumed each year than in 1960. At $US3.00 per gallon it is equivalent to $7.7 million per day or $2.8 billion per year in fuel.

Such is the compounding effect of small numbers multiplied by larger numbers to bring about incredible impacts. The interconnections between obesity and climate change are not immediately obvious because, to understand them, you need to realise they involve linkages

between human health and nutrition, motor vehicle design and operation, the physics of energy production and fuel usage and global climate science.
The same is true for any other health problems involving complex social, environmental relationships. Katrina has taken these basic factors and put them into a systems diagram that connects all these not so obvious interactions into a set of causal loops with positive and negative feedbacks. It clearly shows how the extent of physical activity affects the prevalence of obesity while another causal loop shows changes in climate where the atmospheric concentrations of greenhouse gases affect global temperatures.

Some clear linkages start to appear - like how global temperatures affect the extent of physical activity while the number of vehicles affects the amount of fuel used and the amount of CO_2 emitted. Of course this all enhances the level of atmospheric concentrations of greenhouse gases. In my mind the important thing about this type of systems thinking and analysis is that it makes explicit the complex and often unseen linkages between economics, obesity and fuel use.

This approach allows, and perhaps even demands, that scientists from different disciplinary backgrounds work together to address the overall issue and not just their own disciplinary subset of a complex social-environmental problem, such as urbanisation and health. I am pleased to say some of my colleagues from the National Centre for Epidemiology and Population Health at ANU are working together with health practitioners in ACT Health and my team at the CSIRO on this way of understanding these complex interactions.

I would like to look at another way of thinking about these issues. I hope you can see I am creeping up on the nexus between urbanisation and health, but I want to come back and keep reinforcing the basic connection between rising resource use and health at the individual level and the effect they have at national and global levels. Another way to think about this is to use the concept of urban metabolism.

Consider the metaphor of the city as a giant organism that metabolises the resources it consumes, taking in raw materials and discharging wastes in linear flows to landfills, oceans, rivers and the atmosphere. Then consider the new way of thinking about the city as an urban ecosystem where the wastes and emissions are transformed through circular flows or closed loops. The waste is recycled and reused as resource input for other urban goods and services. It’s a significant and substantial shift in the way we think. But there’s a lot of interest now in ‘benign by design’ engineering processes that help us figure out where problems are emerging in resource systems and then designing them out of manufacturing or waste disposal processes by use of ‘closing the loop’ processes that enhance recycling of materials.

This way of thinking is called ‘industrial ecology’. It recognises that there are wastes, emissions, knowledge, products and services that are outputs from our urban systems. And we can measure ‘urban systems indicators’ such as health and well-being, monitor them and evaluate them to provide the knowledge that allows us to change the way we design and develop our urban structures and how we think about the health of people in urban environments.

This is just one way of thinking that is particularly appealing to environmental scientists. There are many other ways of thinking that emerge when we sit down and talk with social scientists or economists or engineers or planners and start to build up a more complex and rich way of looking at things. But the way of tracking the flows of materials and energy through cities is very important in terms of coming to understand our resource use per capita and its consequences.

If we look more closely at this urban metabolism framework we see that the average number of people living in Australian households has declined from about 4.5 in 1910 – in the days of our grandparents and great-grandparents – to approximately 2.7 people per household in 2000. During the same period the number of Australian households has grown from about one million to seven million. Now there are seven million households making decisions about the choice of materials for the curtains, or a sofa, or energy, or a car, or clothing or electronics. So once again it is the small decisions multiplied by many units that are bringing about a change in the way we use resources in the city.

Take our housing stock, where the average new house size in square metres has increased 31 per cent between1985-86 and 1999-2000. The trend to larger houses reflects rising levels of affluence – not family size or household size. People have come to expect these rising living standards as measured in material terms and, as we know, these sorts of expectations translate to political imperatives, higher energy use and environmental impacts. For example, the urban phenomenon of smaller households in larger houses has led to higher resource use per person in terms of the amount of energy used. We now use 60 per cent more energy than in 1976 for a population increase of only 35 per cent. Analysis of the per person use of other urban resources such as food, water, construction materials and packaging is generally following the same sorts of trends.

With housing stock there is a slow turnover rate compared with clothing or energy. Slightly more than half of our housing stock is between 30 and 100 years old. This means that we are living in yesterday’s cities. It means urban structures and processes are not likely to have adapted well to the rapid pace of urbanisation over the last couple of decades, nor are people likely to have adapted to the health effects of living new lifestyles in old cities.

But now of course people are addressing these problems. There is a lot of urban renewal going on, a lot of retro-fitting of better ways of using energy and water. However, the general housing stock involves a huge amount of infrastructure, in terms of energy and water that has a long development trajectory, compared to how we would think about and design developments now. The key problem is that once this urban infrastructure is built it has a long lifetime; we become locked in to the old trajectories and renewal of old brown buildings and urban infrastructure is very costly compared to getting it right with new green buildings and urban infrastructure systems. Consequently there is an urgent need to make wise decisions about planning and designing new urban developments so they don’t exhibit the emerging problems of urbanisation and health. Hopefully urban planners and urban researchers can come and talk about the complex problems, and what we call the urban sustainability challenges of our times, in seminars like this. And of course we need also to be asking the urban development industry how they are responding to this.

From an urban research perspective, I am starting to put considerable effort in CSIRO into developing what we call action research projects. This involves forming partnerships which connect researchers to people in practice and policy, with a strong emphasis on engaging with the urban development industry and local communities affected by urbanisation. I am taking a different design approach – a very different way of doing science in terms of thinking about how we frame this urban sustainability problem, how we come to conceptualise it and how we start to see the goals and opportunities that can emerge from this way of thinking.

There is also the important aspect of our science having beneficial impact from the actual process of how we engage with the people who live in urban places, make decisions, formulate policy and design and develop new ways of building and constructing urban environments. The best way of doing this is by engaging with people on projects. You actually get down and do things together. You become involved in building something where people have a stake in its outcome and everyone becomes more accountable. It is a very good way of trying to bring about a better understanding of what works and what are the barriers and constraints to changing urban practices.

Ultimately, as people engage in environmental research in cities, we need to be able to bring new ways of thinking about such complex urban systems to the table, ways that add value that - in the nicest way - disrupt other ways of thinking so the new issues and solutions can emerge. We need to be able to work with health professionals, with urban planners and designers, with property and urban developers and with the community whose health and well-being is the overarching goal for urban sustainability.

In Canberra there are lots of healthy people, but is it a healthy city? I am not sure that I know the full answer to this question in terms of quantifiable evidence and I am not sure if we actually have the systems in place to tell us. We do know that Canberra is a wonderful place to live and work and that there are many opportunities here for healthy lifestyles, if only we can get the work/life balance in check and find time for exercise. As a young, planned city we have the opportunity in Canberra to unravel some of the complexities of urban research - in terms of spatial, social and systems analyses - that help determine health in cities. By developing improved development assessment techniques and urban sustainability metrics, we will be able to provide reliable, consistent and reproducible methods to determine whether the city is healthy and to use this urban knowledge elsewhere.

There is a simple analysis that can be performed for two urban archetypal forms, archetypes in the sense of different patterns of urban development: the loop and lollipop, as the Americans like to call it, and the linear form of traditional urban development – that we are now starting to see come back into the urban form. From a simple spatial analysis the area accessible within 400 metres of home, by walking along the streets to the shopping centre, the transport hub or the school, is far less in the looping development than in the linear form. Some 38 per cent of the area is accessible within a 400 metre walk.

In the traditional development, within the same 400 metre radius, 60 per cent of the area is accessible. This means that there are likely to be less people living within the 400 metre threshold for walkability in the loop and lollipop urban form than in the linear form. In addition, between 400 metres and 800 metres there is a critical threshold in terms of the time that people are willing to put into walking. Once we cross these sorts of thresholds more of us begin driving our kids to school or we find reasons not to walk to get a litre of milk. These simple metrics are now being evaluated in real detail in places like Perth where Billie Giles-Corti and her students at the University of Western Australia are looking at different urban forms and how to include these sorts of analyses and understandings into design criteria for new urban developments to increase physical activity and lower health risks such as obesity.

This gives urban developers clear evidence-based policy and practices to follow to incorporate simple measures of walkability into the urban form that will enhance our health. On the other hand, if these factors are not considered during planning and design, then it becomes very difficult indeed to change the shape of urban forms later, or to acquire, for example, from existing landholders laneways that encourage walkability through looping developments. After all, who is going to give up their existing hedge or their favourite trees for an urban developer to enhance walkability at some time in the future?

It is a real challenge for effective community engagement, truly listening to people and being able to work with them and bring their values into practice, while also articulating the full costs, by which I mean the economic, social and environmental cost benefits and consequences of taking different urban development pathways.

Proceeding with business as usual has costs, as does creating a green building or something in between. We need to understand what those costs and consequences are by simulating them, rather than building the development and evaluating the costs 30 years later. We need to implement urban designs, policies and practices that reduce resource use per person and increase well-being. We need to design healthy urban habitats for people and other species in sustainable urban developments and I would argue all are very achievable.

In conclusion, I don’t think we can design new urban forms for health alone, or for water alone, or for energy alone or for climate change alone. We need integrated urban planning and design that takes on the challenge of urban sustainability and solves these problems by adopting different patterns of design, construction and consumption.

Right now, even as we are rapidly urbanising our peri-urban, rural and coastal landscapes, these design goals appear to be at odds with the current growth form. What we need are clear examples of new ways of designing and constructing housing as exemplars in urban developments and urban renewals, developments that reduce energy and water consumption per unit while delivering improved health, well-being and the quality of life that the majority of Australians value and want to keep.