DHB Successes

in Environmental Sustainability

A report to Community and Public Health

Canterbury District Health Board

CDHB Mission statement

To improve, promote and protect the health of the people in the community and foster well-being and independence of people who experience disabilities and reduce disparities

CDHB Values

Care and respect for others Manaaki me te whakaute i te tangata

Integrity in all we do. Hāpai i ā mātou mahi katoa i runga i te pono.

Responsibility for outcomes. Te Takohanga i ngā hua.

Authored by G. M. Keating June 2017

Executive Summary

This report gives information on successes in the environmental sustainability work of six District Health Boards (DHBs) that other DHBs can use in developing their own sustainability initiatives. Key informants from the four major metropolitan DHBs in the North Island (Auckland, Capital & Coast, Counties Manukau, and Waitemata) plus Bay of Plenty and Nelson Marlborough DHBs were interviewed in late 2016.

The overall picture is that DHBs have implemented many successful policies and practices that promote environmental sustainability, many individual staff and work groups have taken sustainability actions, and numerous sustainability actions in the health sector have financial benefits as well as benefits to environmental health. Supportive policies from a DHB and central government help individuals and the organisation as a whole to adopt more sustainability actions.

What were their successes?

All DHBs reported successes in energy management. Waste management and travel (both for work purposes and in commuting to and from work) were other areas of success, which different DHBs achieved through a range of approaches. All DHBs have methods of measuring ongoing progress in some targeted areas.

What systems and processes did DHBs use?

For several DHBs, a general principle underpinning their environmental sustainability work is that healthy environments are important for human health. From this perspective, DHBs (as health agencies) and individual health professionals have responsibilities to enhance, rather than undermine, the environmental bases of community health resilience.

While all six DHBs previously had individual programmes of work directed towards particular issues (e.g. energy, waste), most now have, or are moving towards, a more comprehensive approach that links the range of sustainability work across the DHB into an overall strategic work plan. The four metropolitan DHBs have organisational policies and staff time dedicated to sustainability. They have a formal multi-disciplinary structure that informs or oversees the sustainability work programme. All four have processes for communicating with staff about and engaging them in sustainability issues, to varying degrees.

All six DHBs reported that active informal staff champions or networks work on sustainability issues within their own areas. In some DHBs the initiative for sustainability actions came from the senior management team. However, commonly it was staff members who first proposed the DHB-wide sustainability programmes and then the leadership team acted on the initiative jointly with staff champions.

All the DHBs highly valued links with external organisations. All DHBs had networks that provided information. In addition to information and advice, some linked organisations (such as Energy Efficiency Conservation Authority and local councils) also provided financial investment or material resources. Individuals and DHBs as organisations made links. Some were local links, others made national and international connections.

What contributed to the success of individual projects?

All successful activities were based on commitment to the project. This commitment came from senior management or staff groups, or often both. An important reason for the success of some projects was that management decided to change the physical environment; in other cases, local champions encouraged changes in the way that teams in particular services worked.

Financial feasibility was important for all successful activities, no matter what their size and scope. Major projects required a business case; single, staff-initiated, service-level projects could occur within existing resources. With dedicated staff time on the projects, it was easier for good ideas to move through the stages of clarification, design, business case development, monitoring, cycling through modifications, and to spread across the organisation.

Most of the successful projects paid attention to two specific factors. First, they changed the operating systems or environment. Second, they involved ongoing engagement with staff and support to make changes that were workable for staff.

Central government policies influenced both small and large activities. Financial and fiscal policies (including, for example, carbon price) influenced business case decisions on whether to start larger-scale projects. Across time, the presence or absence of a government policy setting for procurement or transport could influence DHBs' other ongoing activities.

Recommendations

The following are recommendations for DHBs considering how to develop their sustainability work, based on the information from the interviews. DHBs could expect some gains from adopting a subset of these recommendations. However, it is likely that if they carefully invest a modest amount of their resources in the whole package of recommendations, they will make greater longer-term gains in environmental health and achieve either financial neutrality or benefits.

Organisational leadership

- Align the approach to sustainability with the DHB's mission and values.
- Develop, communicate, implement and report on a DHB-wide policy on sustainability that is, and is seen to be, supported by the Chief Executive and leadership team.
- Encourage widespread leadership across the organisation through a formal, cross-disciplinary steering group, and enable informal teams and champions.
- Support staff to follow the health and sustainability positions of national and international health organisations.

Organisational resources

- In business cases, consider long-term costs and benefits, including whole-of-life-cycle for products and services.
- Fund a role (which could be incorporated as part of an existing staff position) to support the development of sustainability across the breadth of the DHB.
- Support data collection for meaningful implementation, tracking and reporting.

Organisational learning, modelling and communicating

- As an organisation, seek out and join local, national and international sustainability umbrella organisations so the DHB can gain and share knowledge.
- Use existing communication processes to inform staff, the governance board, patients and communities of the DHB's commitment to sustainability, and the success it achieves, and develop additional communication processes as needed.
- When interacting with peer organisations (both other health service organisations, and other types of organisations in your local community), discuss, model and learn with each other about practices and system factors that support sustainability.
- Provide opportunities within the DHB to develop and share knowledge, including information that staff bring from internal service-based initiatives, and from local, national and international health networks.

Staff opportunities for leadership

- Align your approaches to sustainability with ethical values of your health profession.
- Participate in or lead informal teams within your specific service to take sustainability actions.
- Participate (as appropriate) in formal, cross-disciplinary groups within the DHB.
- Support your peers, trainees and other staff to identify and act on the health and sustainability positions of our national and international health organisations.
- Encourage your health professional organisations (as appropriate) to discuss, model and learn with each other, and provide educational resources about practices and system factors that support sustainability.

Staff actions for learning, modelling and communicating

- Take opportunities within your DHB to develop and share knowledge, including information from your service-based initiatives, and from your local, national, and international health networks.
- As a health practitioner, seek out and personally participate in local, national and international health and sustainability organisations to gain and share knowledge.
- Use the opportunities for learning about sustainability in your professional organisations (as appropriate) and claim relevant continuing professional development credit.

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Note: The April 2017 version of this reported contained an error of name and presentation that have been corrected in this June version.

1. Introduction

Health services have a substantial environmental impact.[1] In recent times health professionals and health services have been seeking to reduce that effect. [1–6] Community and Public Health (CPH) of the Canterbury District Health Board (Canterbury DHB) asked for information on successful actions taken to reduce greenhouse gases and improve environmental sustainability. Its aim was to gain more information on what an achievable sustainability approach in the Canterbury DHB could look like, as part of a reconsideration of its current activities. CPH agreed that the report on this study could subsequently be made publicly available and included in other research outputs.

Specifically CPH was looking for answers to the following questions:

- What approaches and activities for environmental sustainability and carbon reduction have other DHBs undertaken (including, for example, processes or staff positions)?
- Which activities do they see as successful?
- What are the characteristics (e.g. emissions source, implementation process) of successful activities?
- How have DHBs measured the success of activities?
- What do they see as the reasons for their success?
- What lessons have they learned that would help in scaling up or repeating the project?

The study first focused on the four major metropolitan North Island DHBs (Auckland, Capital & Coast, Counties Manukau and Waitemata). It later expanded to two additional DHBs (Bay of Plenty and Nelson Marlborough). Key informants in selected DHBs were invited to be interviewed. Informants gave written consent that their DHB would be named in this report and they personally could be identifiable.

Interviews were semi-structured and recorded. Notes were made from the interviews and supplementary reports or public information. Each person interviewed received a copy of the notes to correct or confirm. In this report, direct quotations from the DHB informants are in *italics.* Appendix I gives more information on the study informants and methods.

2. DHB Successes in Environmental Sustainability

All the DHBs interviewed identified successful environmental improvement programmes in relation to energy and travel, which they usually measured to guide action and monitor progress. Most also identified successes in waste management. In addition, two DHBs (Auckland and Waitemata) reported success with water management and two (Bay of Plenty and Auckland) with telehealth services. Auckland also reported success with medical gas management. While most programmes are site-specific, the three DHBs in the Northern region all participate jointly in the Northern Regional Alliance procurement programme.

Table 1 lists the projects that the six DHBs reported. For more information on individual projects, see Appendix II.

What activities were successful and how did DHBs measure success?

How the DHBs assessed the success of their sustainability actions depended on both the individual DHB and the type of action involved. Some metrics were part of routine management data that were relatively easy to identify and report, such as amount and cost of coal, while some required dedicated data collection (e.g. use of rideshare or active commuter transport infrastructure). Others were not quantified but nonetheless viewed as successful (e.g. staff were using video-conferencing facilities, but no counts were kept). Table 2 identifies the numerical measures the DHBs reported for their activities.

Table 1: Major areas of environmental sustainability work reported by six DHBs

DHB	Energy	Waste management	Travel – commuting, by staff and patients	Travel - work-related, by land and air
Auckland	Energy efficiency and management Sustainable building design principles	Procurement management Reduce and recycle, including PVC [plastic] recycling	Staff travel planning	In process: car fleet composition and use In process: support video-conferencing, review air travel activity
Bay of Plenty	Building management system Coal boiler replacement	Recycling – initially cardboard, then other including PVC	Commuter rideshare, bike infrastructure	Increasing availability of video-conferencing
Capital & Coast	Completed plant and equipment upgrade with investment support from Energy Efficiency and Conservation Authority – ventilation – lighting – emergency generators	A combination of organisation-wide actions (e.g. PVC, recyclable drink cups) and service-specific actions (e.g. more careful separation of infectious waste; change ECG printing default)	Partner with regional council to make travel planning available	

Table 1: Major areas of sustainability actions reported by six DHBs (continued)

DHB	Energy	Waste management	Travel – commuting, by staff and patients	Travel – work-related, by land and air
Counties Manukau	Several in process	Reduce – unneeded items in standard packs, unnecessary packaging Reuse – e.g. washable drink cups Recycle – better separation Supported by procurement agreements	Partner with public transport in council (staff, visitors and patients) Commuter rideshare Increasing amenities: – showers – bike security etc	Increasing availability of video-conferencing Reduced air travel Reduced footprint by shifting to economy class
Nelson Marlborough	Landfill methane partial substitute for coal Progressively retrofitting LED			Car fleet rideshare Shuttle between work locations Electric car trial
Waitemata	Completed – Energy – LED upgrade Several in process Other built environment in development	Recycling in all areas, PVC trial at Waitakere and Elective surgery centre Sustainable Procurement (in advisory capacity)	Commuter rideshare, bike infrastructure	

Table 2: Numerical measures of success reported

	Energy	**Waste management**	**Travel – commuting, by staff and patients**	**Travel – work-related, by land and air**	**Other**
Auckland	Electricity and gas use	Waste to landfill by type Clinical record paper use			Medical gas management – stock, age, condition
Bay of Plenty		External audit	Rideshare premium Bike lock-up use		
Capital & Coast	Energy consumption	Independent audit Kg recycling	Staff commute mode		
Counties Manukau	Energy per floor area	Waste and recycling volumes, landfill costs Single-use items ordered	Public transport counts Rideshare signups Premium parking permit use Bike lock up use	Air travel total, business class Video-conference use	

	Energy	Waste management	Travel – commuting, by staff and patients	Travel – work-related, by land and air	Other
Nelson Marlborough	Cost and amount of fuels by type Electricity cost			Cost of car travel in trial	
Waitemata	Monthly energy use	Monthly waste, recycling	Carpooling Bike infrastructure		Monthly water use

3. Policies, Processes and Resources Supporting Sustainability

The study asked DHBs about their organisational processes and resources for their sustainability work. Their responses covered plans and processes, staff resource, extent of staff involvement and relationships with external organisations.

Policies, processes and staff resources

The four larger DHBs (Auckland, Capital & Coast, Counties Manukau and Waitemata) have dedicated staff resource for sustainability activities. They also have or are developing formal sustainability strategy or policy documents and a mandated cross-organisation steering or advisory group with processes for communicating widely with staff. Nelson Marlborough and Bay of Plenty have no policies, current dedicated staff nor mandated cross-organisation group for sustainability work, although Bay of Plenty previously had a steering group that is being relaunched as the Green Team.

Table 3 lists the plans, processes and staff resources that the six DHBs reported.

Staff involvement

All DHBs reported that informal champions or teams of staff acted in their local areas to make their delivery of health care more environmentally sustainable. Nelson Marlborough and Bay of Plenty indicated that the number of staff-initiated local actions has varied with the level of support the organisation gave them. In Capital & Coast and Counties Manukau DHBs, a staff initiative led to the formal adoption of their DHB-wide sustainability approach. In Bay of Plenty, a staff initiative prompted the DHB to join the Sustainable Business Network.

Table 4 gives further information on staff involvement.

External links, including certification

All the DHBs had links to external organisations that provide information and support (see Table 5). Relationships with local Sustainable Business Networks, the Energy Efficiency and Conservation Authority (EECA), Enviro-Mark and local councils were common.

Auckland, Counties Manukau and Bay of Plenty noted that by participating in external groups they made highly valuable links and gained access to information, ranging from health-specific knowledge and data from international groups to particular details of services and options relevant in their own district. Bay of Plenty emphasised the value of external role models across the wide range of private and public sector organisations that are part of Sustainable Business Networks as mainstream business activity.

As part of their Certified Emissions Measurement and Reduction Scheme (CEMARS) certification, Auckland and Counties Manukau monitored greenhouse gases. The Auckland data emphasises the unusual greenhouse gas profile of hospitals: medical gas is their fifth-highest emission source, while their highest single emission source is staff air travel. Nelson Marlborough routinely monitors emissions from a number of sources (solid fuel, petrol, diesel, air miles, rental cars, electricity), although it does not participate in a certification programme.

Table 3: Sustainability plans, staff resources and processes contributing to sustainability work

	Key documents	Dedicated staff	Formal group structure	Communication
Auckland	CEMARS carboNZero Emissions Management and Reduction Plan Annual Plan	Originally 1 FTE (2013), now less, merged with role of Business Transformation Manager	Sustainability Working Group; sponsored by CFO and Chief of Strategy. Plans and provides oversight of work programme based on the CEMARS Reduction Plan. Members from Facilities, Operations, Clinical Services, Procurement	Strong focus on staff communication, engagement, participation, leadership including staff inductions, staff newsletters, intranet, emails, workshops
Bay of Plenty	Under development, likely using Global Green and Healthy Hospital Framework	No dedicated staff; attendance at internal and external sustainability networking meetings by some staff recognised	Previously (2007–2012) Conservation Steering Group, led by CEO and CFO Recently informal Green Team has been upgraded to a strategic group	
Capital & Coast	Under development	1 FTE Sustainability Officer created 2015 (uptake 2016) Facilities management	2011 Sustainability Steering Group – senior management, clinical, facilities and communications staff; co-chaired by SMO staff member and senior management team member	Regular sustainability column in the staff "Health Matters" newsletter and a specific monthly "green newsletter" for staff
Counties Manukau	Environmental Sustainability Strategy 2012 Environmental Sustainability Annual Report	1 FTE Sustainability Officer Executive Programme Director's implementation team	Environmental Sustainability Advisory Group (across the organisation including clinicians) indicates options and priorities for projects, including business cases	Two websites Regular content in CEO blog Regular monthly newsletters with opt-in staff emails
Nelson Marlborough	–	No dedicated sustainability staff; major role for energy specialist	–	–

	Key documents	Dedicated staff	Formal group structure	Communication
Waitemata	Sustainability policy 2014 Core design principles for Waitemata 2025	Since 2010, 1 FTE in Facilities and Development	Environmental protection group, chaired by member of Senior Executive Team	Regular communication with sustainability champions to provide information and seek ideas for work plan

Key: CEMARS = Certified Emissions Measurement and Reduction Scheme; CEO = Chief Executive Officer; CFO = Chief Financial Officer; FTE = full-time equivalent; SMO = Senior Medical Officer

Table 4: Staff involvement in sustainability activities

DHB	Informal teams	Staff-initiated activities
Auckland	Monthly sustainability forum for learning and information exchange, open to all staff	Input to design, training and learning for success, whether staff initiate individual projects with business support and empowerment, or vice versa
Bay of Plenty	Green Team – network of 30–50 people from all areas, clinical and non-clinical, meet and initiate sustainability activities within their own areas and resources	Staff initiated proposal to join Sustainable Business Network Many local actions Initial dedicated resource opened up channels for staff to take active steps
Capital & Coast	Informal Green Initiative Group	Prior to Sustainability Steering Group: – localised staff grassroots initiative in theatre spread to form the informal Green Initiative Group – support of Clinical Leaders/Medical Reference Group – input of other health-sustainability advocates – a wide range of staff made suggestions
Counties Manukau	Network of green teams	A small group of senior clinicians initiated strategy through an approach to CEO Currently active in advisory group and Green Teams Clinical leadership roles include initiating activities, understanding the local clinical context to design effective implementation, communication and education
Nelson Marlborough	Several informal green teams, across disciplines Management support for Green Teams varied across time with different senior leaders	Has varied across time
Waitemata	Sustainability champions	Senior executive team seeks ideas from staff sustainability champions

Table 5: Certification and external links

	SBN	EECA	GGHH	Councils	Enviro-Mark	Certification
Auckland	✓	✓			✓	CEMARS 2015 Target: 10% greenhouse gas emission reduction in 5 years to 2020
Bay of Plenty	✓			✓		
Capital & Coast		✓	✓	✓		
Counties Manukau	✓	✓	✓	✓	✓	CEMARS 2011/12 Target: 20% greenhouse gas emission reduction in 5 years to 2017
Nelson Marlborough		✓				
Waitemata	✓	✓	✓		✓	Enviro-Mark Gold 2014

Key: CEMARS = Certified Emissions Measurement and Reduction Scheme; EECA = Energy Efficiency and Conservation Authority; GGHH = Global Green and Healthy Hospitals; SBN = Sustainable Business Network

4. Reasons for the Success of Sustainability Projects

This section gives a broad overview of reasons contributing to the success of the sustainability projects, across the DHBs overall. It does not reflect any individual DHB. For information on individual projects that were successful, see Appendix II.

Factors that contributed to a project's success related to:

- Features of the DHB ;
- the processes and strategies used, and the individuals or groups that used them;
- influences outside the organisation.

These factors were highly inter-related: all of them influenced and were influenced by others.

Features of DHBs that contributed to success

DHBs that were making progress on sustainability typically had four features in common: commitment; using evidence to inform action; aligning the projects with the culture of the organisation; and making use of financial and material resources.

Commitment

Having the commitment of the organisation and of groups and individuals within it was essential to all successful projects. Examples of such commitment are: individuals educating themselves and others, or

reducing their single-passenger transport trips; groups working out how to integrate a new approach into their work; and organisations adopting policies and plans that promote sustainability.

Senior management commitment to sustainability was a key to the success of many (but not all) projects. For some DHBs the only element of senior management commitment that mattered was the formal adoption of policies. For others (Auckland, Capital & Coast, Counties Manukau), in addition to formally adopting policy, the Chief Executive Officer and others in the senior leadership team visibly participated in sustainability actions, as communicated through staff or public media. Their high-profile involvement was seen to demonstrate personal as well as organisational commitment.

Senior management commitment was essential for programmes that required new budget allocation of resources (staff time or other expenditure). However, for most sustainability projects in the majority of DHBs, senior management commitment alone was rarely sufficient. The success of projects in areas such as energy, waste management and transport needed additional commitment from staff work groups and individuals.

Some sustainability projects could be successful when staff groups and individuals were committed to them without a formal organisational policy or intention. Examples are small-scale recycling projects at Capital & Coast and Bay of Plenty. However, widespread success across different sustainability areas and different parts of the organisation needed the combined commitment of the organisation, small groups and individuals.

The level of commitment from organisations and individuals was not fixed; it varied across time, across individuals and within an organisation.

What influences senior management's commitment to sustainability?

Senior management were more likely to adopt sustainability policies when they could see the financial benefits and efficiency. The focus on finance could be nuanced, with some DHBs identifying the importance of considering costs and benefits in the longer term and considering the total balance of costs and benefits rather than narrow assessment within individual service budgets.

Several DHBs reported that senior management's adoption of general sustainability policies fitted with the organisation's culture and values. Two DHBs (Auckland and Counties Manukau) saw themselves as services focused on ongoing research and innovation and on health service quality. As they saw it, environmental sustainability is an extension of that culture.

Four DHBs (Auckland, Capital & Coast, Counties Manukau, Bay of Plenty) indicated that their organisation's commitment to sustainability was a way to empower, encourage, engage with and recognise staff. Some of these DHBs identified that their approach to staff empowerment was linked with their explicitly stated priority to improve community health in parallel with hospital-based service delivery. When staff raised the issue of environmental sustainability in these DHBs, senior management gained the opportunity to both engage more closely with staff and support community resilience.

In most DHBs, staff have initiated many sustainability activities. Two (Counties Manukau, Capital & Coast) explicitly noted that their DHB began its formal sustainability programme in response to approaches from staff.

The governance board of the DHB may also influence the DHB's commitment. Both Auckland and Counties Manukau report on sustainability to their governance board.

What influences staff members' commitment to sustainability?

Most study informants repeatedly emphasised widespread enthusiasm among health service staff for a sustainable environment because of its impact on community health resilience. They identified this concern as the underlying motivation for staff commitment to actions in their DHB workplace.

Using evidence to inform action

The majority of DHBs (Auckland, Capital & Coast, Counties Manukau, Bay of Plenty) spoke of the importance of access to knowledge and information and of the opportunity to learn. The types of information they found helpful were:

- the types of sustainability actions that have been successful elsewhere, especially in situations like their own;
- the actions that were happening within the DHB to which staff could contribute;
- baseline and monitoring data.

DHBs that had relationships with national or international sustainability organisations (Sustainable Business Networks, EECA, Enviro-Mark, Global Green and Healthy Hospitals) often described them as highly valuable sources of information.

Knowledge of successes elsewhere could spread though networks within and beyond the organisation, between colleagues across services and disciplines, nationally and internationally. Information on successes elsewhere spread more readily to people and service groups when organisations had joined networks and used internal communication processes.

DHBs with staff communication processes (including forums or groups) saw them as effective ways of sharing information on progress and successes across the organisation. Some of the DHBs actively engaged staff champions and opinion leaders; clinical leaders could have roles of helping to spread knowledge. Some DHBs used these networks for two-way communication, seeking input from staff for planning future activities.

Aligning projects with the organisation's culture

Both Auckland and Counties Manukau identified pre-existing social roles and norms that made it easier for their DHB to adopt sustainability projects and practices. Both DHBs valued ongoing clinical service innovations, service delivery changes, and research as part of clinical excellence and quality; and in both the senior management sought to respond to clinical staff concerns and empower staff action. Both these DHBs emphasised the leadership role of senior clinicians. In a similar way to the knowledge flows and influences described above, both the actions of individuals and formal actions of the organisation contributed to developing cultural norms in the organisation that supported future sustainability actions.

While not emphasising the role of clinicians, both Nelson Marlborough and Bay of Plenty noted that individual sustainability project processes could have wider influence on social norms and expectations.

Using financial and other material resources

Where projects needed a relatively low level of resource, work groups or individual departments could implement them within their own budgets and initiative. For major projects in all DHBs, it was necessary to make a business case to demonstrate their financial viability to senior management. Three DHBs (Counties Manukau, Nelson Marlborough, Waitemata) noted that total costs and benefits need to be considered, across all budget areas and across the life cycle of purchases or investments (e.g. *don't get caught up in just unit price).*

Several DHBs had investment agreements with EECA. Through these investments those DHBs proceeded with projects that brought long-term financial benefit.

For many projects, it was essential to have available particular material resources that were available, reliable and readily usable. Examples are recycling bins, video-conferencing technology and transport booking systems.

Dedicated staff time

Most DHBs (Auckland, Capital & Coast, Counties Manukau, Bay of Plenty) identified the value of having dedicated staff time for sustainability activities. The sustainability role (which could be combined with other roles in a staff position) contributed across multiple dimensions of success. The tasks included participating in planning, building support, initiating projects, identifying links with essential external parties and providing information and feedback. One important role was to contribute analysis for business cases, particularly getting the timing right by including sustainability costs and benefits early in decision-making. Another valuable role was communications and encouraging staff engagement in sustainability actions.

Where DHBs did not have an identified individual in a specified role, they could make some progress, depending on the extent to which other staff had approval to act. If senior management recognise that certain staff roles can include sustainability actions, they support individuals to make legitimate use of their time to share information and make links within and between organisations.

Processes and strategies that contributed to success

Study informants described both specific and general actions that contributed to success. Some were generic implementation processes or strategies (planning, engaging, executing, and reflective evaluation), while others related to details of particular actions in specific settings.

This section, for convenience, groups actions into relatively separate, abstract headings. However, the informants commonly emphasised that processes fed into each other and that some strategies could function in multiple ways (e.g. a staff forum can contribute to planning, engagement, education for a specific project, sharing successes or other knowledge).

Planning

Elements of successful planning for a sustainability project were: responding to the type of issue; tailoring to the local context; and timing. Some, but not all, projects operated with formal project management structures.

Type of issue

Most projects draw on multiple success factors *that can be characterised as technological, process-driven or behavioural.* Depending on the type of issue the project is addressing, one of these factors may be more dominant than the others. Technology has been particularly important to the success of the majority of energy-related successes. Behavioural factors were critical for recycling and travel projects, where physical resource and environmental change also often contributed to their success.

For more on how the type of issue interacted with multiple success factors, see "Changing physical resources and the environment" below.

Adapt and tailor to context

Most DHBs mentioned carefully considering *the specific issues in your own DHB* and *understanding the local clinical context to design effective implementation*. Relevant issues ranged from the size and physical location of services, barriers or opportunities related to external organisations, and precedents elsewhere in the organisation, to the influence of a few key individuals.

Timing and sequencing

Planning to get the timing right was a valuable part of a sustainability officer's role – they needed to be familiar with many issues across the organisation and link that knowledge to taking action at the right time. Getting the timing right had the two important purposes of:

- putting sustainability into contract decisions at the right time (e.g. procurement, building development)
- making use of knowledge, modelling or actions elsewhere to build commitment and contribution.

For example, changing the energy management system is easier to achieve when a DHB is refurbishing or constructing a building. Similarly, introducing physical changes to support behaviour changes (e.g. establishing bike commute infrastructure such as showers and secure storage) was easier when the DHB was planning changes to a building for other reasons. In relation to consumable items, a new procurement contract offers opportunities for bringing in additional waste reduction and recycling changes more smoothly.

Planned rollout is a way of progressively building staff and organisational knowledge, skill and commitment. Precedents and trials not only gave opportunities to work out *teething problems* but also offered working models, encouraged other staff and *socialised the idea of sustainability.*

Timing of education and promotion campaigns could be planned to build on actions elsewhere (such as to coincide with the local council's transport activities or Bikewise month).

Engaging

Building engagement and relationships was an essential element of all the successful projects. Engagement fed into several different strands of action. The most important was building commitment and encouraging participation. Other purposes of engagement were to plan and develop actions, share information, increase understanding and provide training, and for evaluation and learning.

Engagement was ongoing and cyclical. It also happened between different levels of the organisation in all directions – *top-down and grassroots.* Any part of the organisation could initiate engagement and the process may need engagement across all other parts *whether individual projects are initiated by staff with business support and empowerment, or vice versa.*

Dedicated staff time for sustainability was particularly valuable for engagement processes through *staff communication, engagement, participation.* This *opened up channels for staff to take active steps,* perhaps tracking down usable internal knowledge or packaging ideas into business cases or policy proposals that offer *solutions, not problems, for executive managers.*

The different methods used in engagement are briefly described below in "Communicating, modelling, educating and persuading".

Executing

As the "Type of issue" section above notes, the mix of strategies that contributed to a project's success depended on the specific situation of the DHB and the particular sustainability issue. This section discusses the strategies DHBs described in interviews. The most common successful strategies were changing physical resources and the environment, and communication-related strategies. Others were offering incentives and supporting users to make changes.

Changing physical resources and the environment

Changing the physical environment and available physical resources is a strategy that features in the majority of successful projects. The type of changes needed depended on the specific issue. In some situations, the change introduced a technological solution; in others the organisation contributed resources that individuals and teams could use to make changes to their work.

Some major environmental changes (such as installing automated building control or lighting systems, which all the DHBs in this study have adopted to some extent) depend on centralised technology-led strategies. Other such strategies included changing default settings for printers or changing procurement agreements for standard packs to eliminate unneeded items or packaging.

Technological solutions, backed by commitment from senior management, were successful when they were *well designed, easy to use, practical, few barriers to adoption, reliable*. After adopting them, the organisation is then usually able to monitor both financial and environmental benefits, although further fine-tuning may be needed.

Most projects included changes to physical resources as one part of a group of *careful change management* strategies.

Staff commuting is a behaviour-led change, but people can more easily change their behaviour when the DHB restructures the environment and provides supporting resources. Informants saw infrastructure for active commuting by staff (e.g. bike safe storage and/or showers at Counties Manukau, Waitemata and Bay of Plenty) as contributing to the progressively greater numbers of staff choosing to adopt active transport for commuting.

Success in recycling and work-related transport projects involved a combination of technology-led and behaviour-led strategies, along with attention to processes.

It was not enough, for example, to simply buy recyclable items, such as drinking cups or theatre packs. Crucial accompanying strategies were to provide meaningful information, education and modelling, along with enough recycling bins that were conveniently placed, from the users' perspective, to support staff separating out infectious, recyclable and reusable materials.

Similarly, successful changes in work-related transport (e.g. modifying the car fleet, booking systems for sharing travel between sites, video-conferencing options) went along with giving people opportunities to learn how to adopt the new approach and working to *help staff make the change.*

Communicating, modelling, educating and persuading

Three DHBs (Auckland, Capital & Coast, Counties Manukau) used multiple types of communication approaches in their projects. Some were deliberate umbrella communications about sustainability in general; others were planned, issue-specific communication strategies. These DHBs also explicitly recognised the importance of informal, organic communication across the organisation.

In the interviews, the majority of DHBs (Auckland, Capital & Coast, Counties Manukau, Bay of Plenty, Nelson Marlborough) emphasised the importance of communication strategies. Their descriptions touched on the purpose, who made communications and the means of communication.

Purpose? Multiple methods and communicators strengthened commitment, increased the ways that users worked with and integrated new approaches and enhanced the actions taken. DHBs had provided both formal and informal education, and skill training to help people learn about and effectively use new equipment or processes. Communications emphasising the environmental benefits of the new approach could increase commitment and motivation to adopt the new system. Successful early adopters were identified (and opportunistically observed) as role models to strengthen commitment or illustrate the relevant skills, or both.

Who? DHBs had a wide range of people who played communication roles (communications staff, senior management, staff with designated sustainability roles, clinical leaders, peers). As the "Engaging" section notes above, the communication happened between different levels of the organisation in all directions.

How? The vehicles of communication included meetings and forums, newsletters, website and blogs, staff induction and issue-specific promotions.

Incentives

Two of the DHBs reported using incentives. Counties Manukau and Bay of Plenty offered the reward of premium parking for staff adopting ride-share as part of their package of action on staff commuter transport. Both reported uptake of the reward has been very modest.

Support for users

Several DHBs identified the general importance of helping people to make changes. These DHBs used their sustainability officer *to support process changes for implementation* although they gave few concrete descriptions in interviews.

Evaluative and iterative approaches

As Table 2 shows (see Section 2), all the DHBs measured the impact of at least some of their sustainability activities. They used this data for tracking progress, in audit for managing the activity, and for evaluating tests and pilot projects. Most DHBs identified the value of making incremental changes, adopting changes progressively, and ongoing learning. Some DHBs where Plan–Do–Study–Act (PDSA) cycles are well established in clinical quality improvement followed the same processes in their sustainability projects.

In addition, many DHBs used the data as part of communication activities to promote the project and celebrate successes, building commitment and morale.

Influences outside the organisation that contributed to success

Influences on a project's success that came from outside the DHBs included: the DHB's location and access to local government and community resources; and government policies.

Location, local government and community resources

A DHB's physical location contributed to successes in some areas that would not have been possible elsewhere. Piping methane from landfill is viable as a substitute for coal to heat Nelson Hospital. Under current costs, being close to the dump is one key element that makes this substitution economic for Nelson but not for other hospitals. At Wellington Hospital, on a public transport route with very frequent buses, and in a city where many residents are active and public transport users, the number of staff commuting on public transport is comparatively high.

All three Auckland DHBs stated that the Northern Regional Alliance makes sustainable procurement easier.

DHBs saw both local and international community sustainability organisations that share information as very valuable. Local Sustainable Business Networks could provide detailed local information; international organisations such as Global Green and Healthy Hospitals could share service-specific information.

Local and regional government programmes supported successful transport actions (Capital & Coast and Counties Manukau) and waste management projects (Bay of Plenty and Capital & Coast).

Government policies

Some study informants referred briefly to the presence or absence of central government policies and resources in relation to the DHBs' sustainability work. Policies they noted that have been supportive were:

- EECA's role as a source of investment funding for capital projects with positive but longer-term cost-benefits;
- the carbon charge (and consequential environmental costs of fuels), which influences cost–benefit decisions in business cases;
- support for sustainable procurement programmes.

5. Conclusions and Recommendations

This small study of six New Zealand DHBs gives a picture of current successes in sustainability as seen by key informants from these DHBs, supplemented in some cases by additional notes provided by informants and information from public websites. It was limited by the relatively small number of interviews conducted and the time available.

For most DHBs, sustainability actions have developed across many years with contributions from across the organisation – individuals, clinical and other work groups, departments, professional groups, management groups and governance. Individual projects build on previous actions and interactions within and beyond the organisation. For example, in its project of reducing carbon emissions through video-conferencing, Bay of Plenty built on previous clinical telemedicine and video-conferencing knowledge and experiences within that DHB and elsewhere. The physical resource of video-conferencing facilities is essential. Equally essential, across time, is that individual staff, enthusiastic early adopter champions, contributed their experiences, within the DHB and elsewhere, acted as role models and provided peer education. Current groups of staff together are contributing by changing their meeting style and learning to use the new technology.

Success in reducing the environmental impacts of DHBs came from the same types of processes and strategies recognised to support improvements in clinical health services.[7–11] Leadership and champion commitment, resources, processes, information and system changes are all ingredients that can enable organisations and health care staff to plan, trial and modify actions for health care. Environmental sustainability successes, as the DHB informants have described it, follow these same paths.

The following are recommendations for DHBs and their staff when considering development in their sustainability work. They are based on my interpretation of the information provided. DHBs could expect some gains from adopting a subset of these recommendations. However, it is likely that if they carefully invest a modest amount of their resources in the whole package of recommendations, they will make greater longer-term environmental health gains with financial gains or net neutrality.

Organisational leadership

- Align the approach to sustainability with the DHB's mission and values

- Develop, communicate, implement and report on a DHB-wide policy on sustainability that is, and is seen to be, supported by the Chief Executive and leadership team.
- Encourage widespread leadership across the organisation through a formal, cross-disciplinary steering group, and enable informal teams and champions.
- Support staff to follow the health and sustainability positions of national and international health organisations.

Organisational resources

- In business cases, consider long-term costs and benefits, including whole-of-life-cycle for products and services.
- Fund a role (which could be incorporated as part of an existing staff position) to support the development of sustainability across the breadth of the DHB.
- Support data collection for meaningful implementation, tracking and reporting.

Organisational learning, modelling and communicating

- As an organisation, seek out and join local, national and international sustainability umbrella organisations so the DHB can gain and share knowledge.
- Use existing communication processes to inform staff, the governance board, patients and communities of the DHB's commitment to sustainability, and the success it achieves, and develop additional communication processes as needed.
- When interacting with peer organisations (both other health service organisations, and other types of organisations in your local community), discuss, model and learn with each other about practices and system factors that support sustainability.
- Provide opportunities within the DHB to develop and share knowledge, including information that staff bring from internal service-based initiatives, and from local, national and international health networks.

Staff leadership actions

- Align your approaches to sustainability with ethical values of your health profession.
- Participate in or lead informal teams within your specific service to take sustainability actions.
- Participate (as appropriate) in formal, cross-disciplinary groups within the DHB.
- Support your peers, trainees and other staff to identify and act on the health and sustainability positions of our national and international health organisations.
- Encourage your health professional organisations (as appropriate) to discuss, model and learn with each other, and provide educational resources about practices and system factors that support sustainability.

Staff actions for learning, modelling and communicating

- Take opportunities within your DHB to develop and share knowledge, including information from your service-based initiatives, and from your local, national, and international health networks.
- As a health practitioner, seek out and personally participate in local, national and international health and sustainability organisations to gain and share knowledge.

- Use the opportunities for learning about sustainability in your professional organisations (as appropriate) and claim relevant continuing professional development credit.

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I belong to OraTaiao: The New Zealand Climate and Health Council and am currently a member of its Executive Board.

Gay Keating

Appendix I: Method and Informants

The overall objective of this study was to gather information on successful actions to reduce greenhouse gases and improve environmental sustainability in the New Zealand health sector. In the first instance, this information was for Canterbury DHB, and subsequently would be communicated more widely.

The University of Otago Human Ethics Committee approved the project (D16/343).

I asked members of the Sustainable Health Sector National Network to identify key informants in DHBs. I then emailed and telephoned these individuals with an invitation to participate or suggest an alternative person to interview.

All DHBs approached identified an appropriate staff member who agreed to an interview. All those who spoke with me gave written consent to the recording of the interview and that their DHB would be named and they personally would be identifiable. Most interviews were by phone, except for the Capital & Coast interview where we spoke in person.

The interviews were semi-structured based on these questions:

- What have been the environmental sustainability and carbon reduction approaches and activities in your organisation (including e.g. processes or staff positions)?
- Which activities are seen as successful?
- What are the characteristics (e.g. emissions source, implementation process) of successful activities?
- How has success been measured?
- What has success been attributed to?
- What lessons have been learned that would support scaling up or replication of the project?

The interviews were audio-recorded. I made notes from the interviews and supplementary reports or public information. I sent the notes and draft report to each person for them to correct or confirm.

Information concerning activities, policies and practices, and staff was tabulated and reported. All data was then subjected to directed content analysis.[12–14] For further information, please contact gay.keating@postgrad.otago.ac.nz or simon.hales@otago.ac.nz.

The people who spoke with me are listed in below, along with additional documents that DHBs provided or I accessed on public websites.

Auckland

Manjula Sickler, Business Transformation Manager. Additional information from the DHB's Emissions Management Reduction Plan, the DHB Annual Plans[15] and CEMARS.[16]

Bay of Plenty

Debbie O'Byrne (Project Manager, Service Improvement) and Phil Shoemack; Green Team members. Additional information from Travel Plan 2009.

Capital & Coast

Chris Poynter Intensivist Anaesthetist Member Sustainability Steering Group. Additional information from notes and reports provided, and the EECA website.[17]

Counties Manukau

Debbie Wilson, Sustainability Officer. Additional information from the DHB's Environmental Sustainability 2015 Annual Report, and its Green Teams and Theatre Recycling case studies for Global Green and Healthy Hospitals (see Appendix III).

Nelson Marlborough

David Francis, Energy Specialist.

Waitemata

Michael Field, immediate past Sustainability Manager. Additional information from the DHB's Sustainability Policy, Core Design Principles.[18,19]

Appendix II: Successful Projects

This appendix contains extracts from the interviews and supplementary information, with the main focus on factors contributing to success and lessons learned.

A. Overall approach

DHB	What do you see as the reasons for success?	What lessons were learned?
Auckland	Shared vision – centre of excellence for health Shared learning, embracing change Ongoing learning – all groups of staff learning across organisation and discipline boundaries Organisation culture of service innovation, learning and development, clinical trials and research – sustainability projects, trials and implementation are part of that culture Significant staff input to design, training and learning for success, whether individual projects are initiated by staff with business support and empowerment, or vice versa CEO leading a culture of learning and development of innovative leadership skills across the organisation Embedding changes in behaviour by empowerment – building on the understanding that staff are highly educated, highly trained, highly committed	Dedicated sustainability person However, if financial pressures ensue then start with the Annual Plan, move onto a strategy and/or programme under CEMARS.

DHB	What do you see as the reasons for success?	What lessons were learned?
Bay of Plenty	Socialising the idea of sustainability within existing staff Recognising that younger staff expect organisations to be sustainable – robust sustainability programmes are a mechanism to build engagement with the new generation of staff Passionate individuals	Embed in routine way we do things, not dependent on individuals Meaningful measures that can be used to audit and manage activity; framework for action is important; commit to healthy communities and support building community resilience; stop isolating our hospitals from community Dedicated resource As there are many possible options that are raised by enthusiastic staff, to assess where to put organisational effort to gain the best results To celebrate successes Think of the human factor – implement new technology or equipment in a way that staff know how to get best of it e.g. tele and video-conferencing

DHB	What do you see as the reasons for success?	What lessons were learned?
Capital & Coast	Leadership engaged in change, building from multiple staff initiatives and input, with support of clinical leaders/medical reference group Core group of staff, networked in the organisation to make best use of differences in skill sets, time available and mutual support and accountability Across time can use positive stories to support ongoing changes and troubleshoot other areas that need more attention Linkages to other health-environmental sustainability peers elsewhere in the country and internationally Each activity has a success factor that can be characterised as technological, process-driven, behavioural or a combination	Top-down and grassroots engagement Dedicated staff time to ensure successful processes, as well as metrics and communication Use of external partner organisations

DHB	What do you see as the reasons for success?	What lessons were learned?
Counties Manukau	Increasing awareness and commitment to sustainability of staff across the organisation; everyone else wants the same things – contributing to a sustainable environment for healthy communities Early involvement in change processes – such as at the beginning of supply chain tendering processes, building development or change	Understand the specific issues in your own DHB Historical – clinician involvement in initiating the strategy Clinical leadership roles include initiation, understanding the local clinical context to design effective implementation, communication and education Talk to the heart, telling the story, it makes perfect sense Consider total costs and benefits, don't get caught up in just unit price. Ask simple questions Expect multiple benefits in the longer term, for health care quality, staff commitment and community benefit
Nelson Marlborough	Improved sustainability is a consequence of energy management and efficiency driven by cost	Ensure senior management support (including financial buy-in) Start by presenting clearly the ways that the project or programme aligns with senior management priorities Understand that everyone is very busy, so be clear how it fits with different priorities, be able to explain the benefits on many levels, and if behaviour change is needed, make it easy with few barriers to adoption until the new approach is ingrained
Waitemata	Senior management commitment Success is in formally adopted practices, supported by management	

B. Energy projects

DHB	Energy project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Bay of Plenty	Building Management System (BMS)	2007 install electronic management to maintain steady building temperature in new hospital build 2013 review – further gains possible depending on the way the system is used; implement additional staff training on using the new BMS system	New build gave an opportunity to change – implementable at minimal cost Make incremental changes – install, check, additional training, changes	Use previous successes as a model for future changes (eg opportunity for step change when renovating kitchen - equipment, food waste) Help staff make the change – the human factor – how to implement new technology or equipment so staff know how to get best of it
Capital & Coast	Cutting electricity consumption	Upgrading plant and equipment (ventilation, lighting, emergency generators). This energy-efficiency initiative was carried out in collaboration with EECA	The optimisation of our plant is a technological solution (improved metering and modular control of fresh air handlers + LED lighting replacing fluorescent tubes) that gives users no choice	Use of metrics as a way to assess progress and also as a way to promote and reinforce the changes Communication and engagement about benefits obtained from initiative, internally and externally
Counties Manukau	Energy consumption	Building and opening a large new building (the Clinical Services Block) with improved technologies with energy saving in mind resulted in beneficial energy metrics – not led by the ES [environmental sustainability] programme per se!	Staff engagement with regards to energy saving (turning lights and computers off) could account for some	

DHB	Energy project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Nelson Marlborough	Substitute coal boilers on Nelson site by landfill methane	No use was being made of methane from landfill, it was being burnt on site Property officer put case which was agreed and implemented in 2005 Pipe from landfill takes methane to the hospital Burning methane replaced 60% coal usage (1000 tonne coal pa) Future options to optimise system performance	Economics: distance to landfill – pipe length and cost	Financial viability depends on specific physical and technical factors and on cost point of the many elements involved. These change across time, including carbon charge Compare at Wairau: Distance – cost of pipe infrastructure; quantity energy the landfill generates vs heating needs; co-generation of electricity on the hospital site currently not economically advantageous Note: carbon charge, environmental costs of coal and its trucking are not part of cost
	Retrofitting LED (note also reduction of Hg to landfill)	EECA – part funded as a single project Labour intensive so implemented progressively across the site	Financial benefits are clear	Make sure the lighting plan design works for the use of the relevant space Use a reliable and recognised product

DHB	Energy project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Waitemata	* LED upgrade * Energy management software Built environment policy	Senior management support		

C. Waste management

DHB	Waste project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Bay of Plenty	General recycling	Cardboard recycling from 2000; 2007 dedicated sustainability staff under facilities management Other types from 2008. (Note: Directives around sustainable procurement have not been continued under current government) Initially no recycling on site – added recycling options, removed rubbish bins Includes hazardous waste battery disposal	Initial resource of staff time Precedent set in some areas encouraged staff to come up with own ideas and suppliers to find solutions in own service Grassroots support Easy options for recycling	Use/keep own data (cf external agency such as city council audit holding data) Work with suppliers to manage waste – both recycling solutions and reducing unnecessary waste Need to maintain foot to pedal for continuing implementation Initial dedicated resource opened up channels for staff to take active steps Staff may need support to move beyond expressing concern that there is a need Have to come up with solutions to take to executive managers, not add problems
	Operating Theatre recycling PVC	Baxter ,(supplier)provided a grant for equipment for collection		

DHB	Waste project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Bay of Plenty	Waste management – paperless systems	Done for the purpose of service improvement to patients and communities, that has sustainability benefits Progressively with availability of electronic and web-based systems Saves staff person time More efficient – both better effectiveness and lower costs	Ease and speed	
Capital & Coast	Improved segregation, increase recycling	Separating more recyclables from landfill disposal Theatre campaigns – packaging, paper Better segregation of infectious waste; clinician led; more recycling bins; change location and size of infectious yellow bins Process changes (e.g. re-program ECG machine printing) Waste minimisation plan to be developed	A combination of behavioural and process improvement factors (Still uneven across functional units)	
	Stop buying non-recyclable single-use cold drink cups	Styrofoam to paper cups Branding with Hospital Foundation logos	Leadership engaged in change – championed the initiative together with Hospital Foundation Staff morale – seeing visible implementation of their ideas for change, steps in right direction	

DHB	Waste project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Capital & Coast	Clinical service change – online lab reports	Previous duplication of same result online and printed copy Clinical Practice Committee and Patient Safety Group reviewed processes Printed duplicate eliminated		
	Product stewardship PVC (plastic) recycling	Staff concern at high level of PVC waste Staff Green Team identified a PVC recycler To be able to separate and transport materials, sustainability officer supported implementation process changes for appropriately robust systems E.g. Waste separation that is ergonomic, easy and quick for staff to use Subscribed to existing product stewardship scheme by Baxter (provider of IV fluid bags) Set up separate collection of the PVC bags, and reverse logistic with producer	Careful change management implementation Existing scheme is free of charge Staff awareness from colleagues working in other areas – staff want to recycle, know there is an option to recycle, will use if recycling is easy to manage and does not increase their work Plus communication prior and post implementation to ensure ease of use by staff Additional staff feel-good factor – recycled PVC goes to make children's playground materials; staff view that their recycling not only reduces emissions but is also going towards a public good	

DHB	Waste project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Counties Manukau	General waste reduction	Use the quality improvement model of PDSA cycles that staff are already familiar with Establish Green Teams and clinical champions Information via a number of ways – website, opt-in emails, blogs, noticeboards Two aspects – organisation-wide and staff-identified specific issues *Organisation wide* Replace personal wastepaper bins with recycling bins plus desktop cubes Worm farm trial *Staff work areas identify their own areas for change*		
	OT recycling and theatre pack rationalisation (OT may generate up to 30% total hospital waste)	Project management framework (see Appendix III for more detail) Staff enthusiasm Working with suppliers to identify recycling options		

DHB	Waste project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Counties Manukau	Purchasing	Since 2013, working with Regional Alliance, developed environmental impact criteria for purchases: • amount and ability to recycle packaging materials • ability to recycle product • products from recycled materials Stationery, foam single-use cups, food waste	Sustainable approach familiar across the DHB Build in sustainability at the beginning of new supply contracts Align with suppliers – expect success in recycling	

D. Travel

DHB	Travel project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Bay of Plenty	2006–2009 travel plan	Partial funding from New Zealand Transport Agency Identify rideshare when three or more staff use the same car Dedicated premium car parking Encourage use of public transport	Dedicated resource with expertise – brought in contactors	People with expertise Should set achievable scale of change Work with relevant external agencies (in this case the bus company concerning timing of public transport) Identify metrics that enable you to track changes
	Staff – bike commuting	Build on previous project, from 2009 (i) Promote the concept – link with Bikewise national promotions, particularly in February; encourage staff (ii) Make it easy to adopt – provide shower facilities and bike lock-up	Make bike commuting easier	Get in at the beginning of organisational change; when any office moves location, ensure refurbishing has shower facilities and bike lock up

DHB	Travel project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Bay of Plenty	Staff – meetings and conferences	Follow from use in clinical areas for virtual consultations Access to hardware – only two locations, only operates within DHB Encourage staff uptake – start with enthusiastic users Tolerate teething problems	Equipment available Role models elsewhere Enthusiasts to lead the project Huge time-saving compared with long trips across the district Progressively become accustomed to a different way to interact, develop ways to deal with loss of nuanced information compared to face-to-face meetings	Find enthusiastic lead users – get them to lead the project and they will also commit to iron out bugs and convince others Understand that behaviour change is needed and this needs to be accommodated It will be situation-specific whether it will be better to implement step-wise across the organisation vs all together [in] one fell swoop
Capital & Coast	Staff travel plan, from 2006	Temporary use of a travel planner	Staff resource committed to travel plan Pre-existing Wellington public transport use and infrastructure Geography and staff living near hospital	

DHB	Travel project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Counties Manukau	Staff and patient attendances at hospital sites	Staff travel plan began before Environmental Sustainability Strategy adopted; subsequently role merged with the SO [Sustainability Officer] role Multiple approaches: • active walk to work • reduce car use – "rideshare" car pooling • increase use of public transport Working closely with Auckland Transport (AT) Promotion to staff Information – three expos, travel website, monthly newsletters, information for new staff Provide options – bike lock-up Incentives – premium parking for cars displaying two rideshare permits, discounts for service at a particular retailer Give away HOP cards pre-loaded with some travel funding paid by AT Environmental Sustainability Advisory Group interested in a travel strategy for all involved in CM [Counties Manukau] health – patients, visitors, not just staff	Working with external agency – Auckland Transport	
	Work-related air travel	Working with SMOs [Senior Medical Officers] – information on carbon footprint of different travel and conferring options Increasing availability of video-conferencing facilities		

DHB	Travel project	Implementation process for the project	What do you see as the reasons for success?	What lessons were learned?
Nelson Marlborough	Staff shuttle and pool car rideshare for work travel	Transport office prior to 2012 developed a planning tool for use of DHB pool car travel Internal rideshare – when booking a trip, can see if someone else is already going Daily shuttle between hospitals	Convenient – a good service, well designed Management encouragement Obvious to staff that single car use is wasteful	System created with local user in mind Well designed, easy to use, practical, few barriers to adoption, reliable
	Electric car fleet evaluation – one year	Trial two cars Identified which routes it could be used on within a day's charge distance (Nelson – Richmond) – unsuited [to] longer trips	Level of available technology Explicit use of a trial with limited, highly specific rollout	Start with a trial basis Clarify where in the fleet it fits, who will drive Apply in right area – fleet duty where it is suited Trial gives an opportunity to familiarise users, "normalised the new", and reduce concerns by demonstrating that it's just another car – not any different

Appendix III: Theatre Recycling Case Study Counties Manukau

Theatre recycling:
Middlemore Hospital Counties Manukau Health

GGHH Agenda Goals
- **Leadership**
- **Waste**

Hospital Goal
Please state what Action Items the hospital hoped to accomplish. For example:
- **Reduce waste**
- **Reduce carbon dioxide emissions**

Progress Achieved
- Financial benefits (savings, spending reductions or costs reductions)
- Environmental benefit (reduced emissions)
- Human health benefit
- Other quantitative results (increased job satisfaction, improved morale, direct and indirect benefits)

The Issue

'Operating departments can produce up to 30% of the total hospital waste'.

The green theatre team was established during 2013 and consisted of a small team of clinicians and non-clinicians intent on making improvements to their practice that went beyond the usual quality, health and safety criteria. The aim of the team was to activate the organizations sustainability mission, raise awareness of sustainable practices and facilitate education to help stimulate ideas and actions for system improvements. Waste was identified as being a key problem in terms of waste volumes going to landfill. In general, theatre departments have been at the leading edge when it comes to recycling and theatre pack rationalization projects. Theatre departments lend themselves to such projects since they generate up to 30% of the total hospital waste. They use a large volume and range of single use products and consequently generate a large volume of waste; arguably, much of this waste is recyclable. Disposing of waste to landfill is often the most convenient and costly option. Making changes to the way people segregate and dispose of their waste is a process of change. The change process has to be managed in such a way that the desired behaviour is sustained. By reducing waste to landfill, volumes operational costs will be reduced and carbon emissions avoided. Reducing carbon emissions impacts the well-being of patients, staff and hospital workers, as well as the society outside the hospital walls.

Sustainability Strategy Implemented
The theatre green team believed by recycling they could save money, reduce emissions and improve morale all at the same time. As a means of addressing this issue of waste, a strategy was developed following a project management framework. In doing so, the process had rigour and resulted in a streamlined approach. The theatre recycling project came under the organizations' Environmental Sustainability programme and is one of the key successful intervention projects that took place over 2014/15.

Implementation process

The planning phase began with several meetings with key stakeholders. Consideration had to be given to what waste was being generated and importantly, of that waste, what could be readily recycled in Auckland. This is important because there are local and regional variances as to what materials can and cannot be recycled. As part of the initial phase, materials were collected and once enough material was gathered, samples were given to the recycling waste provider. See the following table which shows details of recycling and waste streams:

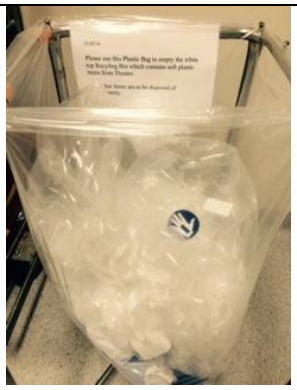
Paper and fine card into the **green bin**	**Mixed recycling** into the **blue bin**	**Soft plastic** into the **orange bin**	**General waste** into a white bag
Green bin needs to be emptied into the **large green paper bin.** This includes medication boxes, glove boxes, backing paper from syringe wrappers.	**Blue bin** needs to be emptied into the **large blue recycling bin.** This includes glass, aluminium and rigid plastic (no broken ampoules or aerosols please).	**Orange bin** needs to be emptied into **a large clear plastic bag.** This includes soft plastic packaging material, clear and opaque and **does not** include fluid bags, giving sets, gloves or kimguard.	Waste for landfill needs to be emptied into the dark green 660L wheelie bin (labelled as waste to landfill).
			

Table 1. Waste streams identification table

Once we understood what could be recycled, then resources could be put in place based around these items. In addition, prior to making any changes, waste counts were taken as means of benchmarking current practice. Pre intervention waste counts quantified the number of white bag (general waste) and yellow bag waste (medical waste). From then on in the team considered what education was required and what tools and resources were needed. In the interim the Sustainability Officer connected with the non clinical support services to map out the waste disposal process and make sure the waste was removed from the theatre and taken to the waste dock where it could be collected by the recycling provider. Any successful sustainable waste management programme involves meeting the requirements of three distinct elements: correct segregation at source, internal movement of waste to an internal collection point and external movement of waste from the collection point to the waste dock and beyond. Each element requires attention and consideration to ensure the right waste ends up in the right waste stream.

Collateral was developed including fact sheets and posters and the 'plastics' theatre became the first theatre to trial the system. Communication to theatre staff formed the next phase, whilst searching for appropriate recycling bins. The recycling project started as a trial and during that trial various different bins were tried out, and feedback was taken on the quality of the fact sheets and posters. All clinicians were involved who used the plastic theatres and this phase lasted several weeks to ensure each new tool was tried and tested effectively. By choosing to trial the project in one theatre, interest was raised as other teams often mentioned that they were also keen to recycle and were eagerly waiting for the trial to go live and across all theatres. During the trial the theatre department relocated into a brand new facility and time was allocated to the new area to ensure any new waste management procedures were fit for purpose at the new site.

Eventually the team decided they needed larger bins, and bins on wheels. Contact was made with a local supplier who agreed to make a trolley with wheels and designed this trolley to fit our purpose. A small time in motion study also helped to show the advantage of capturing the waste in a trolley on wheels. The study revealed how orderly time was saved because they needed to take less frequent trips to the waste room since the waste was segregated and split into additional waste streams.

The bins and trolley were therefore made in NZ, adding more value to the whole programme since the Environmental Sustainability Programme is very interested in economic, environmental and social outcomes. Over the course of nine months and following on from a long period of engagement and evaluation, the project went live across all theatres. Since the trial period was over a few months, engagement was high. The project has been fully employed now since February 2015. Aside from a handful of people, all members of the theatre team have been actively engaged and segregating their waste very successfully.

Tracking Progress

Over the course of the implementation process and well into business as usual, feedback is provided as to how well the team are doing in terms of contamination rates. Waste bin analysis allows for snapshot auditing and feedback. Overall the contamination rates are very low. Waste being recycled totals approximately 800 kgs per week which equates to 26 wheelie bins. Medical and general waste volumes have decreased and costs of diverting waste to landfill lessened. The behavior is considered the new norm and theatre departments are very keen to follow suit, in fact another trial has started on a different site.

Trolley and bins made in NZ by Pioneer 'fit for purpose'

Challenges and lessons learned

One of the most challenging aspects of the project was being able to effectively quantify the impact of adding in additional waste streams to all those involved in waste transportation post the theatre department. Adding any workload onto the non-clinical support services requires careful consideration of existing work capacity. Each of the three elements poses different challenges and requires each member of the team to work closely together in the planning and implementation phase.

Next Steps

Next steps include adding in PVC recycling and fully rolling out at the other main site.

Demographic information

CM Health is a major provider of both community- based and secondary health care services to the estimated 520,130 people residing in the Counties Manukau district. Counties Manukau Health is New Zealand's fast growing multicultural area, and is also home to more new immigrants than any other region.

CM Health operated services are delivered at 7 in-patient facilities and a number of community outpatient sites and community health sites across the District. The Middlemore Hospital and Manukau Health Park (comprising the SuperClinic and Surgery Centre) contain the largest elective, ambulatory and inpatient facilities.

There are 1,000 beds across these facilities, and the services discharge in excess of 115,000 people per annum (across acute, surgical, mental health, maternity and health of older people/ rehab), with Emergency Care seeing over 100,000 people per annum. There are also over 80,000 outpatient first appointments, and 215,000 follow-up events each year.

The organisation is one of the largest of New Zealand's District Health Boards and a significantly large employer in the Counties Manukau district, providing jobs for over 7,000 people across the region, 5,700 FTE. Counties Manukau Health employs over 400 Senior Medical Officers and over

480 medical trainees covering most specialty areas working within our various sites. Counties Manukau employs over 2,500 Nursing staff (Registered and HCA), and over 1,000 Allied Health and Technical Staff.

More information can be found on the website: www.cmdhb.org.nz

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How to Affect Green Change in a Large Organisation: Setting up Green Teams

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Problem

- Practising Sustainable Healthcare targeted waste minimisation in system wide innovative and sustainable ways to reduce the volume of waste going to landfill.

Context

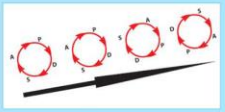
- Programme outcomes required staff engagement.
- Programme implemented throughout Counties Manukau Health in administrative and clinical areas.
- Working in teams' areas identified relevant problems and solutions, fostering a sense of personal team responsibility and ownership.

Methodology

- Using the PDSA cycle for quality improvement:

PDSA = Plan, Do, Study, Act

Ideas tested and changes result in improvement



Intervention

- Recycling packaging from Operating Theatres at Middlemore Hospital, including soft plastics, paper and fine card.
- Critical care Reuse campaign: Staff using their own cups and providing visitors with reusable cups.
- 800 desk top cubes and recycle bins/removal of personal waste paper bins.

Measurement

- Waste volumes, medical and general waste counts.
- Critical Care ordered 7000 foam cups each week, ending up in landfill.
- General waste volumes (white rubbish bag count).

Results

- Theatres now recycle on average **800kg** per week.
- Critical care no longer order 7000 foam cups each week, saving **$2,800** per month.
- White bag counts have reduced by **20%**, based upon departmental pre and post waste counts.
- Tackling these issues using an Environmental Lens staff save money and 'feel good' at the same time.
- Saving money helps our organisation; resulting in positive patient outcomes.

Effects of Change

- Teams established: clinical champions identified.
- Changes made have shown improvements in recycling volumes and reduced waste to landfill charges, saving in excess of $100,000 in waste disposal costs.
- Approach is transferable across areas. Once a **Green team** is in place, many other ideas are generated as a result and other sustainability improvements made.

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A 'green team' is a team of informed, engaged people all aiming to activate the organisation's sustainability mission, raise awareness of sustainable practices and facilitate education to help stimulate ideas and actions for system improvements.

EPICC - Environmental Protectors in Critical Care (Green team)

Reusable cups for visitors to Critical Care

EPICC Notice Board

Theatre recycling bins

Desk top cubes

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