

Health Benefits of Going On-Country

Prepared for the Lowitja Institute

Dr Gwendolyn David • Associate Professor Robbie Wilson • Ms Jennifer Yantarrnga
Professor William von Hippel • Professor Cindy Shannon • Associate Professor Jon Willis



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may be obtained from: www.lowitja.org.au.**

The Lowitja Institute

PO Box 650

Carlton South VIC 3053

Australia

t: +61 3 8341 5555

f: +61 3 8341 5599

e: admin@lowitja.org.au

w: www.lowitja.org.au

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Aboriginal and Torres Strait Islander people are advised that this report may contained images and names of persons who have passed away.



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Jennifer Yantarrnga, Ranger Research Assistant

Philip Mamarika, Senior Ranger

Elma Yantarrnga, Women's Senior Ranger

Jocelyn Yantarrnga, Ranger

Chiquita Bara Bara, Ranger

Ian Kerr, Ranger Manager

Keith Lambert, Ranger Coordinator

Marcelle Kenny, Ranger Administration and Finance Officer

Jason Spires, Ranger Mechanic

Edwin Lalara, Ranger Apprentice Mechanic

Melville Amagula, Ranger Apprentice Mechanic

Tristan Wurramara, Ranger

Josiah Mamarika, Ranger

Other Contributors

Jean Murrungun, Gayangwa Lalara, Gwen Lalara, Sandra Lalara, Gloria O'Hare, Vianetta Chapman, Grant Burgoyne, Nancy Burgoyne, Jaime Heiniger, Ami Fadhillah Amir, Skye Cameron and Eddie Livingston-Jones and Amanda Neihaus.

Summary

Project goal, design and methods

Going On-Country is expected to have many benefits for the physical, social, emotional and cultural wellbeing of Aboriginal people living in remote areas. Whilst there is evidence that 'Caring for Country' programs can improve Aboriginal health, there has been little consideration for the potential benefits of self-initiated activities when On-Country. This research was therefore aimed at finding out if self-initiated On-Country activities are an important source of health benefit for the Anindilyakwa people of Groote Eylandt.

To investigate the benefits of going On-Country, three methods were used:

1. Through oral conversations with Anindilyakwa women, potential benefits and barriers were identified.
2. By volunteers wearing accelerometer units, the amount of physical activity during self-initiated activity was quantified.
3. Using the recommendations set out in previous research, the potential health benefits of self-initiated activity were highlighted.

Findings

- The potential benefits of going On-Country were: a healthier diet, more frequent exercise, greater transmission of culture, increased family-time and enhanced spiritual connectedness.
- Several potential barriers to going On-Country were also identified: access to resources, cultural



practices and obligations, climate, distractions of community life and safety concerns for the elderly.

- The amount of walking by Aboriginal women when On-Country varied considerably depending on the individual, activity and day.
- Beach activity involved four times more walking than when fishing from a boat.
- When looking at the amount of walking alone, health improvements could be gained from at least one hour of beach activity each day (one seven-hour day a week or one weekend a fortnight).

Conclusions and next steps

Whilst there are several barriers to going On-Country, our study suggests it is an important source for improving health of Aboriginal people living in remote areas. In particular, we show that collecting traditional foods is a culturally inclusive activity that is self-initiated and commonly performed On-Country, which in turn can have several health benefits.

It is hoped that this research will be useful in identifying community-driven pathways as targets for improving Aboriginal health.

What drove this research?

Aboriginal people have a strong, beneficial relationship with their Country which is encapsulated in established sayings such as 'healthy Country, healthy people' (Griffiths & Kinnane 2011). Whilst recent analyses have found evidence that 'Caring for Country' programs can improve Aboriginal health (Burgess et al. 2009, Burgess, Mileran & Bailie 2008, Garnett & Sithole 2007, Johnston et al. 2007), there has been

little consideration for the potential benefits of self-initiated activities in remote communities (Johnston et al. 2007). Aboriginal people readily engage in traditional practices when On-Country, therefore identifying the benefit of these self-initiated activities will highlight potential community-driven pathways already present in remote areas that may be important for improving health.

Our research was therefore driven by a wish to draw attention to the potential health benefits of self-initiated activity, particularly traditional practices, when On-Country in remote Aboriginal communities.



What did we want to find out?

What are the potential benefits and barriers to going On-Country in remote Aboriginal communities?

Motivations for going On-Country are to engage in traditional practices, connect with spirit, transmit cultural knowledge to young people, spend time with family and avoid the stressors of Aboriginal settlements (Johnston et al. 2007, Grieves 2009, Poroch et al. 2009). The potential benefits to be gained from going On-Country include better health, fewer distractions and retention of local Aboriginal culture (Grieves 2009, Johnston et al. 2007, Poroch et al. 2009). The benefit however, may vary depending on what type of activity people choose to engage in when going On-Country. Further, the choice of activity may be limited by environmental conditions, accessibility to resources and cultural obligations (Abbott et al. 2008, Johnston et al. 2007, Gray, MacNiven & Thomson 2013). Since every remote community is unique, a greater understanding of the variation in the benefits and barriers to going On-Country is important for developing effective strategies to improve Aboriginal health.

What physical activity do Aboriginal women exert during self-initiated activity when On-Country?

One of the most common reasons for going On-Country is to gather traditional foods, which can require a lot of physical work like digging,

chopping and walking (Johnston et al. 2007). There are numerous detailed descriptions of the many ways to gather traditional foods, however studies that quantify the level of physical activity exerted during such activities is limited. If gathering traditional foods is an important source of physical activity in remote Aboriginal communities, empirical evidence is needed to quantify which types of self-initiated activities are most likely to provide a health benefit.

What levels of physical activity exerted during self-initiated activity when On-Country could meet the minimum level for providing a health benefit?

Although the World Health Organization (WHO) recommends that adults have at least 150 minutes of moderate intensity activity in a week to improve health (WHO 2010), it is widely accepted that any exercise is better than none. Particularly for sedentary people, even small increases in physical activity can improve health. Since higher intensity exercise performed for less time may confer the same benefit as lower intensity exercise performed for longer periods (Murphy et al. 2007), sustained bouts of walking can be a good source of physical activity and carries a low risk of injury (Kassavou, Turner & Murtagh 2013). Research has also shown that exercising in natural environments, when compared to indoors, can increase feelings of revitalisation, energy and positivity, but also decrease tension, confusion, anger,



and depression (Coon et al. 2011). Whilst westernised forms of exercise (i.e. organised sport, attending gyms) can provide sustained health gains in Western society, in remote Aboriginal communities culturally inclusive approaches to incorporating physical activity are more likely to succeed in providing lasting benefits (Burgess et al. 2009, Burgess et al. 2008, Gray, MacNiven & Thomson 2013). By comparing the physical activity exerted when gathering traditional foods On-Country to the minimum levels associated with health benefits, existing community-driven pathways could be highlighted as important features of Aboriginal culture that can improve health.

One of the most common reasons for going On-Country is to gather traditional foods, which can require a lot of physical work like digging, chopping and walking



Our approach: Project design and methods

To investigate the potential health benefits of self-initiated activity when On-Country, a research study was undertaken in the remote area of the Groote Eylandt Archipelago during 2013.

The Groote Eylandt Archipelago is the traditional homeland of the Anindilyakwa people, with population of ~1600. The Anindilyakwa people comprise 14 clan groups that live in three communities (Angurugu, Umbakumba and Milyakburra) with access to several outstations. Although a manganese mine and tourism has brought much opportunity to the Groote Eylandt Archipelago, the Anindilyakwa people endeavour to live a traditional lifestyle. Another community, Alyangula, is also situated on Groote Eylandt but largely services the mining population. The Groote Eylandt Archipelago is a declared Indigenous Protected Area that contains a diverse set of environments, which the Anindilyakwa people utilise for traditional practices.

Project design

Based on previously established relationships through conservation work, the research team together with the ALC Land and Sea Rangers undertook a collaborative approach to this study with the primary focus of maintaining cultural sensitivity and respect for those involved. The project design was as follows;

- I. Four female ALC rangers (including a ranger research assistant) and a female research scientist (FRS), attended a workshop ran by Associate Professor Robbie Wilson at The University of Queensland aimed at exchanging knowledge. Together with the rangers, a greater understanding of the importance of On-Country activities, the data collection techniques most likely to succeed, and the ethical considerations for this project were identified.
- II. Based on the knowledge exchanged during this workshop, ethics approval (#2013000307) was attained for the proposed project which involved female volunteers wearing accelerometer units where comfortable to measure physical activity (e.g. time spent walking).
- III. On the first field trip to Groote Eylandt, the FRS attended the Cross Cultural Course ran by the mine to promote awareness of

the local Anindilyakwa culture. Then, with help from the rangers, potential opportunities for approaching volunteers in a culturally sensitive manner were identified. Also, seven data collection trails were carried out to establish the best settings for the accelerometer units and collect test-data.

- IV. The second and third field trips involved the FRS working very closely with the ALC Land and Sea Rangers, to approach volunteers for the study in a culturally sensitive manner, resulting in the collection of the study-data.
- V. The fourth and final trip to Groote Eylandt, was aimed at presenting the findings to those people involved in the study whereby feedback or changes were invited, then approval was sought for it to be made publically available in a report.

The FRS spent a total of four months on Groote Eylandt with much time spent On-Country with the ALC Land and Sea Rangers, whereby data was successfully collected from three of the days. It is very important to acknowledge that the involvement of the women volunteers in this study and the opportunities to go On-Country would not have been possible without the generous support of the ALC Land and Sea Rangers.



Method

The methods used to investigate the three aims of this project were as follows;

1. To identify the potential benefits and barriers to going On-Country in remote Aboriginal communities, oral conversation was used. Firstly, during the workshop ran by Associate Professor Robbie Wilson, the female ALC rangers were asked to talk about why people go On-Country and what prevents them from doing so. Secondly, through conversation initiated by Anindilyakwa people with the FRS when On-Country, several benefits and barriers to engaging in self-initiated activities were highlighted.
2. To quantify how much physical activity Aboriginal women exerted during self-initiated activity when On-Country, volunteers were asked to wear waterproof accelerometer units wherever was most comfortable. The ALC Land and Sea Rangers created the opportunities to go On-Country,

whereby the volunteers wore the accelerometer units from the beginning of the outing until they returned at the end of the day. During these outings On-Country, gathering traditional foods was common practices which included collecting bait and turtle eggs on the beach, fishing from the boat, fishing from the beach or rocks, sugar-bagging behind the beach, and finding oysters or mussels in the mangroves or on rocks. Accelerometers failed in some instances and walking activity was most reliably predicted from those units worn on the ankle. Therefore of the 14 volunteers, study-data from eight women (aged 14–65 years) on three days On-Country were analysed (see Appendix 1: Table A1 for details). Using the data collected from the accelerometer units, the amount of walking was quantified and classified into three categories based on activity type:

- Beach (collecting bait and turtle eggs on the beach, fishing from the beach or rocks,

sugar-bagging behind the beach, and finding oysters or mussels in the mangroves or on rocks)

- Boat (fishing performed from a boat)
 - Travel (travelling by boat, car or foot to reach destination).
3. To determine whether the physical activity exerted during self-initiated activity met the minimum level for providing a health benefit, the number of steps was estimated from the accelerometer study-data (for details see Appendix 1). Known health benefits according to the number of steps taken were identified in the literature, however time spent brisk walking was converted to steps taken following a pace of 100 steps/minute when required (Tudor-Locke et al. 2011). The recommended number of steps was then compared to those levels taken when On-Country in this study.

Findings

Five potential benefits were identified from going On-Country in the Groote Eylandt Archipelago, they were:

- 1 Diet was healthier
- 2 Exercise was more frequent
- 3 Transmission and learning of local culture was greater
- 4 Family-time was increased
- 5 Spiritual connectedness was enhanced

Several barriers to going On-Country in the Groote Eylandt Archipelago were identified:

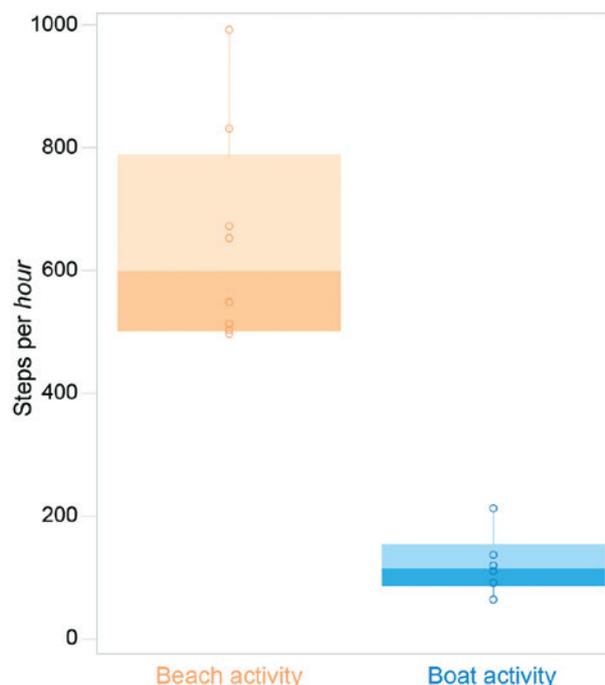
- 1 Access to resources (boat, car and roads)
- 2 Cultural practices and obligations (eg. funeral ceremonies, closed lands)
- 3 Climate (eg. access due to flooding in wet season, temperatures are too hot)
- 4 Distractions of community life
- 5 Outstations are not appealing (eg. Lack of phone reception)
- 5 Safety concerns for the elderly (quick access to medical attention if needed).



Figure 1:

Overall steps taken per hour of self-initiated activity when On-Country

Boxplots illustrate the average number of steps taken per hour of activity across three days (where data available) for each participant (open circles: beach, n = 8; boat, n = 6).



When On-Country, Anindilyakwa women walked 5 times more on the beach than when on the boat (Figure 1), and all walking was low-intensity. The amount of walking by Anindilyakwa women varied considerably depending on the individual, activity type and day (see Appendix 2 for details).

Whilst beach activities included several tasks (collecting bait and turtle eggs, fishing from the beach or rocks, sugar-bagging, and finding oysters or mussels), there were also periods of sitting to rest and eat. For beach activity, on average 652 steps were taken for every hour, but ranged from 480-1020 steps. Whereas for

boat activity, on average 130 steps were taken for every hour, but ranged from 60-240 steps. Importantly, many of the tasks done during beach activity required much upper-arm movement which was not captured from the walking data, for example digging sand for fish bait. Therefore, the estimate of physical activity exerted in this study represents the minimum levels based on walking as it does not take into account the upper-arm exercise involved in collecting traditional foods. From the walking results alone however, health improvements could be gained from at least one hour of beach activity each day, one seven-hour day a week or one weekend per fortnight (Table 1).



Table 1:
Health benefits of going On-Country to the beach

Known health benefits of walking (steps per day) §		Minimum hours of beach activity to achieve health outcome†
500-1000 steps	<ul style="list-style-type: none"> Improves quality of life Reduces depression 	1 hour per day
1000 steps	<ul style="list-style-type: none"> Increases weight loss and insulin sensitivity Lowers blood pressure 	2 hours per day
1500-3000 steps	<ul style="list-style-type: none"> Increases general wellbeing and cardiovascular health 	3-6 hours per day

§ Known health benefits identified in the literature (Villanova, Pasqui et al. 2006; Duru, Sarkisian et al. 2010; Shenoy, Guglani et al. 2010; WHO 2010, Dwyer, Ponsonby et al. 2011; Aoyagi & Shephard 2013; Golay, Brock et al. 2013; Varma, Tan et al. 2014; Hupin, Roche et al. 2015). Studies with recommendations based on 'time spent brisk walking' were converted to steps based on a pace of ~100 steps/minute in adults (Tudor-Locke, Craig et al. 2011).

† Based on the slowest paced participant in this study, with a 501 steps/hour pace. Note the 'hours of beach activity' required to gain a health benefit is based upon walking only and does not take into account the physical demand of upper-arm exercise.

Cautions required when using this study

These preliminary findings, while supportive of health gains linked to going On-Country, need to be viewed within the study limitations. More participants across multiple remote communities, of varying age and gender, sampled over many visits to Country would strengthen the broad applicability of these findings to the general health of Aboriginal people. Knowledge of the baseline levels of health indicators when physically in community compared to On-Country would provide further support to this study. Walking was the only measurement used to quantify exercise in this study, therefore investigation into the physical demand on the whole body would provide a more informative picture of the best sources of health benefit.

What was learned?

The benefits of going On-Country for Aboriginal people are better health, greater transmission of culture, increased family-time and enhanced spiritual connectedness.

Although there are many benefits to be gained from going On-Country, there are also known barriers such as access to resources, cultural practices, climate, distractions of community life and safety concerns for the elderly. Going On-Country, particularly to the beach, is a good source of physical activity as it involves walking on sand, which has a low-risk of injury. Further,

collecting traditional foods is common practice when in a beach environment and requires a great deal of upper-body movement. Aside from the physical health gains from going On-Country, there are also considerable benefits for the social, emotional and cultural wellbeing of Aboriginal people living in remote areas.



Why are these findings important?

New ways of thinking about improving Aboriginal health are required (NHMRC 2010, NHMRC 2012). Access to Country, transmission of cultural knowledge and respect for culture and Country are high priorities for Aboriginal communities and can have important health consequences (Griffiths & Kinnane 2011, Johnston et al. 2007). Culturally inclusive approaches, like self-initiated activities when going On-Country, are more likely to succeed in providing lasting health benefits in remote areas as it

is community-driven and draws upon local knowledge, values and culture (Burgess et al. 2009, Burgess et al. 2008, Gray, MacNiven & Thomson 2013, Nelson 2010). If maintained, even small increases in physical activity exerted when On-Country can have significant health gains for Aboriginal people. Going On-Country to gather traditional foods can require a lot of physical activity, particularly at the beach, and is therefore an important source of health benefit that is self-initiated by community

members. Particularly for elderly members, going for short visits On-Country meant engaging in low-risk walking and experiencing their Country which was important for both spiritual connectedness and having a break from the stressors of community life. As such, these findings highlight that promoting opportunities to go On-Country may be a sustainable pathway for improving Aboriginal health in remote communities.

Next steps

Although the importance of going On-Country is widely expressed by Aboriginal people, there are several barriers that appear to be consistent across remote communities. Minimising these barriers could be an important target for improving Aboriginal health. To better understand how to improve opportunity to going On-Country, several approaches could be explored. Some are:

1. consultation with local people on the best ways to improve On-Country access for dependant
2. provide more resources to already established, trusted and respected partnerships that currently provide community members opportunities to go On-Country (eg. ranger stations, arts centres)
3. create employment of people whose sole outcome is to provide regular opportunity to access Country for community members, particularly for those that are dependant (eg. the elderly and young)
4. continue support for remote schools to integrate 'Learning-On-Country' programs which use Country as a resource for student development, learning and academic achievement
5. upgrade outstations to increase access, safety and appeal to go On-Country (eg. provide phone reception, improve road access).

Conclusion



Our research was driven by a wish to draw attention to the potential health benefits of self-initiated activity when On-Country in remote Aboriginal communities.

Our study suggests that going On-Country is an important source of physical, social, emotional and cultural wellbeing for Aboriginal people living in remote areas. In particular, we show that collecting traditional foods On-Country is a culturally inclusive activity that is self-initiated and carries several health benefits.

Further, this study suggests potential steps to minimise the known barriers to going On-Country in remote Aboriginal communities. It is hoped that this research will be useful in identifying community-driven pathways as targets for improving Aboriginal health.

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Appendix 1: Details of methods used in the study

Table 2:
Details of study data analysed in the study

Participant	Beach activity						Boat activity					
	Day 1		Day 2		Day 3		Day 1		Day 2		Day 3	
	h	s	h	s	h	s	h	s	h	s	h	s
A	-	-	5.6	3080	-	-	-	-	-	-	-	-
B	1.1	796	1.9	537	6.3	2932	2.4	182	4	330	1.5	182
C	1.1	1237	5.6	2773	-	-	2.4	514	-	-	-	-
D	1.1	1157	1.6	456	5.9	3438	2.4	429	4	378	1.5	210
E	1.1	1053	-	-	-	-	2.4	273	-	-	-	-
F	-	-	-	-	2.9	1500	-	-	-	-	1.5	95
G	1.1	923	5.5	874	4.9	2395	2.4	230	-	-	1.5	213

Data from eight participants (A-H) were analysed from three days On-Country. The total time in hours (h) and steps taken (s; based on the sum of estimated counts from 10-second windows, see methods for details) in each activity; beach (collecting bait, turtle eggs, sugar-bags, oysters and mussels, and fishing from the beach or rocks) and boat (fishing performed from a boat). Overall pace, mean steps taken per minute (s/m) across days for each participant where available (se, standard error). The ages of the participants were: >50yo (B, D, E & G), ~40yo (A, C & F) & 14yo (H).

Step calculations

To quantify how much physical activity Anindilyakwa women exerted during self-initiated activity when On-Country, participants were asked to wear accelerometer units wherever was most comfortable (ankle and/or wrist). The waterproof accelerometer units (Gulf Coast Data Concepts X8M-3mini) were attached to neoprene Velcro straps with a sampling rate of 25Hz.

To determine the number of steps walked from accelerometer data, a linear relationship was first defined using the test-data collected in trails by two adult women who wore accelerometers on their right ankle and wrist. The time-coded ankle and wrist training-data were visualised side-by-side as graphical output, from which the ankle data in the x-axis plane provided clearly visible step count profiles. The test-data was divided into 10-second windows and the mean variance in acceleration, g-force (g) calculated. From these 10-second windows, the number of steps was manually counted from 20 graphical

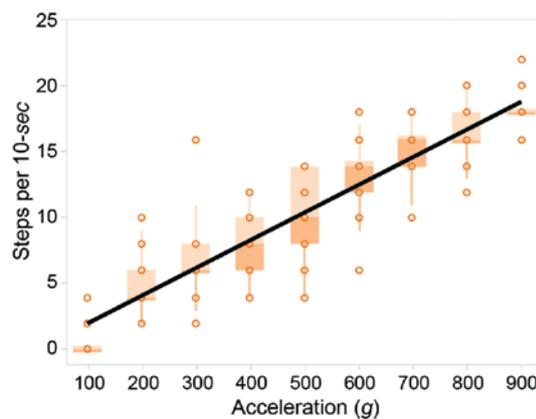


Figure 2:
Relationship between number of steps and accelerometer output from test-data.

Tukey boxplots illustrates the variation in steps taken per 10-second windows for each acceleration level (n = 20), g-force (g). The linear function ($y = 0.010884x - 0.3547$) is illustrated by the solid black line.

outputs in each acceleration level (g = 100, 200, 300, 400, 500, 600, 700, 800 and 900) and multiplied by two as the accelerometer was worn on one ankle only. The linear relationship, $y = 0.010884x - 0.3547$, was calculated from the mean number of steps per acceleration level (Figure A1). This linear function was then applied to the study-data to estimate the number of steps taken per 10-second window.

Statistical analysis

Due to zero-inflated data, a zero-inflated-Poisson generalised linear

model was fitted using the statistical software package JMP Pro (v13 SAS) with the significance of effects of fixed factors (all interactions) based on the Wald chi-square statistic; the response variable, number of steps taken in 10 seconds periods (n = 37080 10-second windows; 103hours), by the effects of: day (1, 2 or 3), activity (beach, travel or boat) and participant (A-H). The overall steps taken per hour of activity was based upon the average number of steps a participant took per hour of beach or boat activity across the three days of data collection.

Appendix 2: Details of findings

Table 3:
Effects on the number of steps taken when On-Country

Effects	df	Wald χ^2	P-value
Participant	2	15.3	0.0005
Activity	2	1281.2	<0.0001
Day	1	0.1	0.792
Participant*Activity	3	58.5	<0.0001
Participant*Day	2	11.2	0.0038
Activity*Day	2	15.1	0.0005
Participant*Activity*Day	5	41.6	<0.0001

Generalised Linear Model (Zero-Inflated-Poisson), steps per 10-seconds by day*activity*participant; Effects of day (1, 2 or 3) activity (beach, travel or boat) and participant (A-H) on the number of steps taken in 10 seconds periods (n = 37080; 103hrs). Results displayed are the fixed effects with significance based on the Wald Chi-Square.

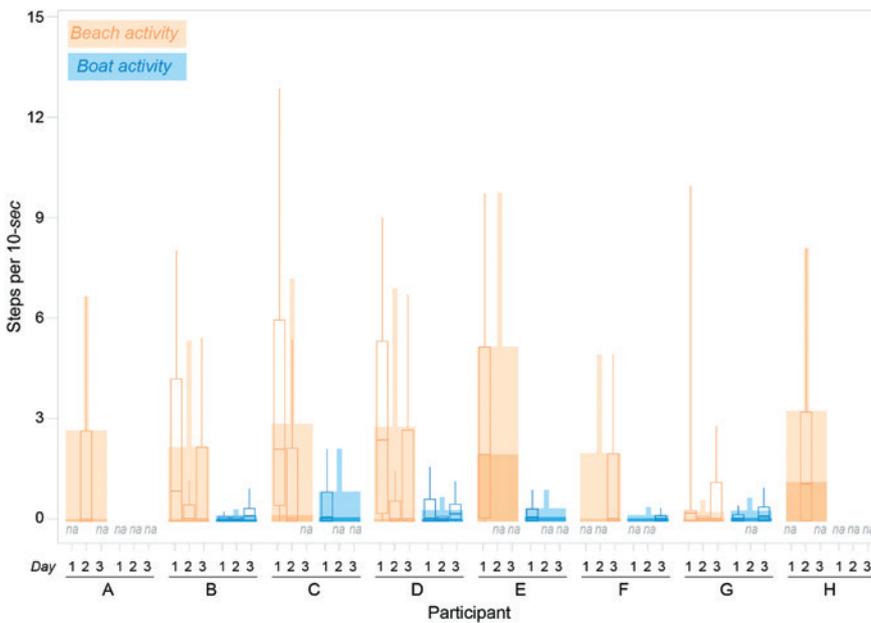


Figure 3:
Variation in walking during beach and boat activity On-Country

Boxplots illustrate the overall (shaded boxes) and daily (day 1, day 2, day 3; open boxes) steps taken by each participant (A-H) per 10-second bout of activity (beach, boat). Beach activity includes collecting bait and turtle eggs on the beach, fishing from the beach or rocks, collecting sugar-bags behind the beach, and finding oysters or mussels in the mangroves or on rocks; Boat activity includes fishing. The ages of the participants were: >50yo (B, D, E & G), ~40yo (A, C & F) and 14yo (H). Note na denotes no data available for that day and/or participant, and outliers are not shown.



Abbreviations, acronyms and terms

ALC

Anindilyakwa Land Council

Caring for Country

Protection and management of cultural and natural resources

CRCATSIH

Cooperative Research Centre for Aboriginal and Torres Strait Islander Health, hosted by the Lowitja Institute

Country

The land, fresh and sea waters, to which Aboriginal people belong

FRS

A female on-ground researcher (a non-Aboriginal scientist) that carried out the research

Health

Physical, social, emotional and cultural wellbeing of individuals and the whole community

On-Country

Being physically present on land, or fresh and sea waters, to which Aboriginal people belong

Traditional practices

Cultural knowledge expressed in local Aboriginal activities (e.g. gathering food, ceremony)

USyd

The University of Sydney

UQ

The University of Queensland

WHO

The World Health Organization



the
Lowitja
Institute

Australia's National Institute for Aboriginal and
Torres Strait Islander Health Research

The Lowitja Institute

PO Box 650, Carlton South

Victoria 3053 AUSTRALIA

t: +61 3 8341 5555

f: +61 3 8341 5599

e: admin@lowitja.org.au

w: www.lowitja.org.au

