

Impact of income management on store sales in the Northern Territory

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The Australian Government's Northern Territory Emergency Response (NTER) was instigated in response to the findings of a Northern Territory Government board of inquiry established to find better ways to protect Aboriginal children from widely alleged sexual abuse.¹ At least partly in response to the concerns expressed in this inquiry, the Australian Government suspended the *Racial Discrimination Act 1975* (Cwlth) in 2007 so as to introduce measures that applied specifically to Indigenous Australians living in remote NT. One such measure of the NTER was the *Social Security and Other Legislation Amendment (Welfare Payments Reform) Act 2007* (Cwlth) (No. 130, 2007) Schedule 2 (Income management regime),² which mandates that 50% of income support and family assistance payments to Indigenous people living in remote areas of the NT, and all of any advances and lump-sum payments, be managed by the government. Under this Act, expenditure of these funds needs to be agreed between the recipient and the government, and the funds can only be used for items considered essential by the government, such as food, clothes, rent, electricity, medicine, and basic household goods.³ Income management was first rolled out in central Australian communities in June 2007, and consecutively thereafter across the Top End communities of the NT. Further legislation introduced with the NTER comprised a store licensing scheme whereby community stores are required to comply with government-prescribed minimum standards in order to benefit from income-managed funds.

As a consequence of remoteness and high cost, Indigenous people in remote NT have been denied equal access to healthy and affordable foods and essential non-food items compared with the general Australian population.⁴ Many people in remote communities experience widespread food insecurity.⁵ This situation has encouraged the purchase of low-cost energy-dense and nutrient-poor foods, and is a key contributor to the disproportionate burden of chronic disease experienced by Indigenous Australians compared with the rest of Australia,⁶ and to poor growth and development of children in early life.⁷ The diet of Indige-

ABSTRACT

Objective: To examine the impact of a government income management program on store sales.

Design and setting: An interrupted time series analysis of sales data in 10 stores in 10 remote Northern Territory communities during 1 October 2006 to 30 September 2009, which included an 18-month period before income management; a 4–6-month period after the introduction of income management; a 3-month period that coincided with a government stimulus payment; and the remaining income-management period.

Main outcome measures: Trends in (i) total store sales; (ii) total food and beverage sales; (iii) fruit and vegetables sales; (iv) soft drink sales; and v) tobacco sales.

Results: Modest monthly increases indicative of inflation were found for all outcome measures before the introduction of income management, except for soft drink sales, which remained constant. No change from the increasing rate of monthly sales before income management was seen in the first 4–6 months of income management or for the income-management period thereafter for total store sales, food and beverage sales, fruit and vegetable sales and tobacco sales. The rate of soft drink sales declined significantly with the introduction of income management and then increased significantly thereafter. The 3-month government stimulus payment period (during the period of income management) was associated with a significant increase in the rate of sales for all outcome measures.

Conclusion: Income management independent of the government stimulus payment appears to have had no beneficial effect on tobacco and cigarette sales, soft drink or fruit and vegetable sales.

MJA 2010; 192: 549–554

nous Australians in remote Australia is characteristically low in fruit and vegetables and high in sugar⁸ with reports of soft drinks (aerated sweetened drinks) contributing up to 27% of the total sugar available through remote community stores.⁹

In the year preceding the implementation of income management, the Arnhem Land Progress Aboriginal Corporation (ALPA), an Aboriginal retail corporation, was funded by the Australian government to develop a voluntary food budgeting tool, the "FOODcard".¹⁰ The FOODcard electronically restricted purchase of certain store items such as soft drinks, potato crisps, confectionery, cigarettes and tobacco products. The ALPA FOODcard became the vehicle for the administration of income-managed funds in the 12 ALPA-managed stores in the NT.¹¹ This was the situation until between December 2008 and January 2009, when the government introduced the "BasicsCard".¹² It is illegal for licensed retailers to accept purchases of tobacco, alcohol, and pornography and gambling products with

the BasicsCard. In October 2008, the Australian Government announced the Economic Security Strategy Payment (a government stimulus payment), under which government-assisted families were provided with a lump-sum payment of \$1000 per child during the fortnight following the 8 December 2008. The payment was also made to eligible pensioners, seniors and others.

Our aim in this study was to examine the impact of income management on store purchasing patterns in relation to tobacco sales and the dietary quality of purchased food and drinks as measured by: (i) total store sales; (ii) food and beverage sales; (iii) fruit and vegetable sales; and (iv) soft drink sales. We used interrupted time-series analysis to examine trends in the sales of these commodities over a period spanning the introduction and continuation of income management. This method allows for the estimation of the effectiveness of an intervention, taking into account underlying trends in monthly sales.



1 Demographic characteristics of the communities served by the 10 Arnhem Land Progress Aboriginal Corporation stores studied

	Arnhem Land Progress Aboriginal Corporation store									
	1	2	3	4	5	6	7	8	9	10
Population served	1574	842	247	595	427	836	362	429	328	317
Month in 2008 that income management commenced	March	May	April	May	June	May	April	June	May	March
Food services in the community other than store	2 take-away outlets,* Meals on Wheels, [†] school canteen	School canteen	Meals on Wheels [†]	Meals on Wheels, [†] school canteen	Take-away outlet,* Meals on Wheels [†]	School canteen	School canteen	Meals on Wheels [†]	Meals on Wheels, [†] school canteen	Meals on Wheels [†]
Alcohol restrictions	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Licenses available to residents to consume alcohol at home [‡]	Recreational club, low strength beverages, restricted hours and days [‡]

* Take-away outlet independent of store. † A Home and Community Care Program service. ‡ Temporary variations were made to these arrangements during the study period.

METHODS

We collected sales data from 10 ALPA stores that had retrospective data available in monthly intervals from 1 October 2006 to 30 September 2009. Communities ranged in size from 247 to 1574 people, representing about 14% of the Indigenous population living in remote NT.¹³ Two communities had access to a take-away outlet that was separate from the community store. All 10 communities supported a school canteen or “Meals on Wheels” program or both. Alcohol was not permitted in eight of the 10 communities at the time of the study (Box 1).

Data were obtained through the ALPA central database in two report formats — department sales data and individual item sales data. Department sales data were used to examine trends in tobacco sales, total store sales and contribution of food and drink sales to total sales. Each monthly department sales report contained a cumulative monthly dollar value for each of the department lines. Individual item sales data included a barcode for each store item sold, an item description, a cumulative quantity sold and dollar value (sale price) for each item sold.

Department and individual item sales data were imported separately into a Microsoft Access 2003 database (Microsoft Corporation, Redmond, Wash, USA). For

individual item sales data, non-food items were removed, weights and volumes for each food and drink item were determined, and food types were grouped.

For department sales data, total store sales and tobacco sales (dollar) values were calculated for each monthly interval based on the dollar value of monthly department sales data for all 10 stores.

For individual item sales data, total food and drink sales values were calculated based on the sum of the value for each food and drink item by store, year and month, as were total sales values for fruit and vegetables combined (including fresh, dried, frozen and canned) and soft drinks. Similar measures with regard to weight (turnover) of the indicator foods were also calculated.

Per capita values for each of the outcome measures were determined based on the size of the community served by each store, as shown in Box 1.¹³ Data were analysed using Stata, version 10 (StataCorp, College Station, Tex, USA).

Statistical analysis

In the interrupted time-series model, the variation in sales was partitioned into four components to provide tests of: (i) the rate of change in mean monthly sales (slope) for the period before income management (pre-

intervention); (ii) the rate of change in mean monthly sales (change in slope) in the first 4–6 months after the introduction of income management (this time period varied across communities, so as not to overlap with the government stimulus payment period); (iii) the change in slope in the 3-month period over which the study communities benefited from the Economic Security Strategy Payment (November 2008 to January 2009); and (iv) the change in slope after the first 4–6 months of income management (excluding the stimulus payment months). November and January were included in the Economic Security Strategy Payment period to account for spending in anticipation of the payment and for delayed spending. The model included a variable for the pre-intervention trend, another representing a possible short-term effect during the first 4–6 months of income management, a third representing a possible effect with a stimulus payment, a fourth for a change in trend following the intervention, and dummy variables for each of the communities. A fixed-effect model was used, which assumes that the pattern of change in each of the communities was similar. As the communities varied, random-effects models were also fitted as a form of sensitivity analysis, but the findings were not greatly different from



2 Summary of average per capita monthly sales for each outcome measure from the 10 Arnhem Land Progress Aboriginal Corporation stores, 1 October 2006 to 30 September 2009

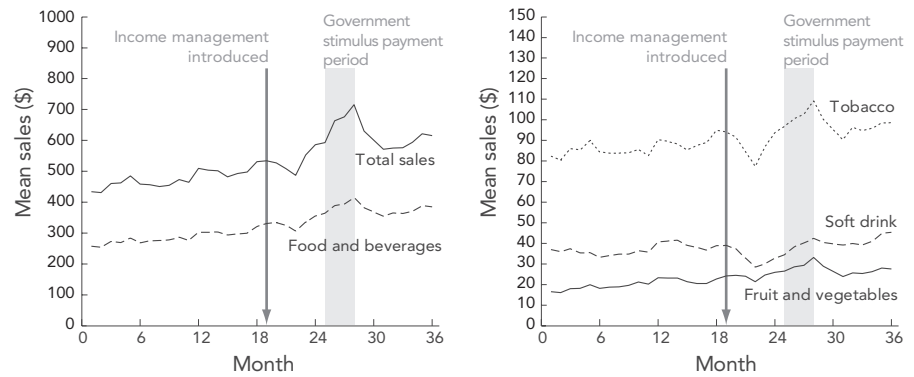
Outcome measures	Pre-intervention*		First 4–6 months after intervention†		Government stimulus payment period‡		Postintervention§	
	Per capita monthly mean (CI)	SD	Per capita monthly mean (CI)	SD	Per capita monthly mean (CI)	SD	Per capita monthly mean (CI)	SD
Total store sales (\$)	458.11 (435.72–480.50)	158.92	537.28 (490.19–584.36)	169.13	648.12 (567.15–729.09)	216.84	583.75 (546.61–620.89)	167.97
Food and drink sales (\$)	265.98 (252.36–279.61)	96.73	323.67 (294.66–352.68)	104.19	370.42 (326.95–413.90)	116.43	355.61 (333.22–378.01)	100.63
Tobacco sales (\$)	83.60 (79.01–88.18)	32.56	87.68 (78.38–96.98)	33.39	99.13 (84.08–114.18)	40.3	93.77 (86.09–101.45)	34.73
Fruit and vegetable sales (\$)	16.86 (16.10–17.61)	5.37	21.90 (20.14–23.67)	6.32	25.68 (23.13–28.23)	6.83	23.48 (22.05–24.91)	6.41
Fruit and vegetable turnover (kg)	3.15 (3.01–3.29)	1.01	4.49 (4.10–4.89)	1.42	4.68 (4.27–5.08)	1.09	4.57 (4.28–4.86)	1.32
Soft drink sales (\$)	34.01 (32.28–35.73)	12.27	29.03 (25.86–32.21)	11.41	36.62 (31.96–41.28)	12.47	38.20 (35.27–41.12)	13.15
Soft drink turnover (L)	8.07 (7.65–8.48)	2.94	6.73 (6.00–7.45)	2.61	8.59 (7.40–9.78)	3.18	8.86 (8.17–9.56)	3.12

* October 2006 to March 2008. † April 2008 to September 2008. ‡ November 2008 to January 2009. § Not including the 4–6 months postintervention and 3-month government stimulus payment period.

those from the fixed-effects model that we report. Inclusion of a lag residual in the model did not affect model outcomes.

We used the model to look for evidence that income management was having an effect on sales over time, as indicated by a statistically significant change in the rate of sales during the first 4–6 months of income management, or the change in rate of sales for the period after this, compared with the underlying trend. If neither of these were significant, there was little evidence that income management had affected sales; if the results of either test were significant, we used the coefficient from the analysis to determine the effect of income management. Descriptive statistics (means, CIs) were used to determine monthly mean sales and turnover (weight and volume) of outcome measures before and after income management.

3 Three-month rolling average per capita sales for total store sales, total food and drink sales, fruit and vegetables, soft drink and cigarettes and tobacco, for all Arnhem Land Progress Aboriginal Corporation stores combined, 1 October 2006 to 30 September 2009



The introduction of income management occurred in one of the study communities at the 19th month, as shown, and commenced in the other nine study communities in the subsequent 3 months.

Ethics approval

The study was approved by the Human Research Ethics Committee of the Northern Territory Department of Health and Families and Menzies School of Health Research. Letters of consent were obtained from each of the participating stores and from ALPA.

RESULTS

Monthly per capita means

Box 2 shows that the average monthly per capita sales for each of the outcome meas-

ures were higher in the first 4–6 months after the introduction of income management, during the 3-month government stimulus payment period, and in the postintervention period, compared with the pre-intervention period. Exceptions were tobacco and soft drink sales. There was a reduction in soft drink sales and turnover immediately after the introduction of income management. Although average per capita sales appeared higher for both tobacco and soft drinks in the postinterven-

tion and government stimulus payment periods, these differences were not statistically significant.

Trends in sales

Total store sales had been increasing slightly before income management was introduced (Box 3 and Box 4) at a rate consistent with inflation.¹⁴ No change in the underlying increase in rate of monthly store sales was associated with income management. There was a significant increase in the rate of sales



4 Summary of interrupted times series regression model* for the study outcome measures in the period 1 October 2006 to 30 September 2009

Reported outcome measures	Pre-intervention [†]		First 4–6 months after intervention [‡]		Government stimulus payment period [§]		Postintervention [¶]	
	Regression coefficient (95% CI)	P	Regression coefficient (95% CI)	P	Regression coefficient (95% CI)	P	Regression coefficient (95% CI)	P
Total store sales (\$)	4.95 (3.45 to 6.45)	< 0.005	1.20 (-5.54 to 7.93)	0.726	100.07 (68.39 to 131.75)	< 0.005	0.92 (-4.05 to 5.89)	0.716
Food and drink sales (\$)	3.48 (2.61 to 4.35)	< 0.005	2.19 (-1.73 to 6.11)	0.273	39.11 (20.69 to 57.53)	< 0.005	0.94 (-1.98 to 3.86)	0.527
Food and drink sales to total store sales (%)	0.19 (0.09 to 0.29)	< 0.005	0.02 (-0.44 to 0.48)	0.939	-3.39 (-5.55 to -1.24)	0.002	-0.23 (-0.57 to 0.11)	0.185
Tobacco sales (\$)	0.33 (0.05 to 0.61)	0.022	-0.25 (-1.521 to 1.03)	0.702	9.79 (3.79 to 15.79)	0.001	0.33 (-0.61 to 1.27)	0.493
Fruit and vegetable sales (\$)	0.36 (0.27 to 0.44)	< 0.005	-0.02 (-0.40 to 0.36)	0.904	3.07 (1.28 to 4.86)	0.001	-0.20 (-0.49 to 0.08)	0.161
Fruit and vegetables turnover (g)	78 (62 to 95)	< 0.005	40 (-34 to 113)	0.295	189 (-156 to 534)	0.283	-50 (-104 to 5)	0.075
Soft drink sales (\$)	0.01 (-0.12 to 0.15)	0.845	-0.94 (-1.56 to -0.32)	< 0.003	3.37 (0.45 to 6.30)	0.024	0.606 (0.14 to 1.06)	0.011
Soft drink turnover (mL)	-10 (-44 to 23)	0.543	-215 (-367 to -64)	0.006	900 (186 to 1 614)	0.014	157 (44 to 271)	0.007

* Regression coefficient values are for rate of change (slope) in sales per capita per month. † October 2006 to March 2008. ‡ April 2008 to September 2008. § November 2008 to January 2009. ¶ Not including the 4–6 months postintervention and 3-month government stimulus payment period. ◆

during the 3-month period that coincided with people receiving a government stimulus payment (Box 4). This same pattern was found for food and drink sales. Monthly food and drink sales increased in absolute terms in association with the government stimulus payment period, but decreased as a proportion of total store sales during this time (Box 4).

We found an increase in monthly tobacco sales for the period before income management (Box 3 and Box 4). In the first 6 months of income management, monthly tobacco sales seemed to drop slightly, but not significantly. This drop was not sustained, and the underlying increasing trend in tobacco sales remained unchanged. A marked increase in sales was associated with the government stimulus payment period (Box 3).

As with tobacco sales, income management had no apparent effect on fruit and vegetable sales (Box 3). A significant but modest increase in monthly sales was shown in the period before income management (Box 4). There was no change in the level of fruit and vegetable sales in the first 6 months of income management. The trend in the postintervention period appeared to decline but did not differ significantly from the underlying trend. As shown for other commodities, a marked increase in monthly

sales was associated with the government stimulus payment period. This pattern held for fruit and vegetable turnover, except that no significant increase in monthly turnover was associated with the government stimulus payment period compared with the underlying increasing trend. This is probably a result of the short time period studied and month-to-month variation in turnover.

Monthly soft drink sales remained constant for the pre-income-management period (Box 3 and Box 4). During the first 6 months of income management, the rate of monthly sales dropped significantly. Thereafter, the rate of soft drink sales increased significantly compared with the underlying trend (Box 4). A marked increase in monthly sales was associated with the government stimulus payment. The pattern for soft drink sales held for the monthly rate in volume of soft drink sold (Box 4).

DISCUSSION

Against a background of increases in total store sales and in all commodities before income management at a rate consistent with inflation, income management appeared to have no effect on total store sales, food and drink sales, tobacco sales and fruit and vegetable sales, independent of the government stimulus payment. Soft

drink sales and turnover dropped initially with income management, but increased thereafter.

These findings suggest that, without an actual increase in income as occurred with the government stimulus payment, income management may not affect people's spending overall. The findings challenge a central tenet of income management — that people's spending habits will be modified in a positive way with mandatory restrictions on expenditure alone.

These findings do not support official government reports of improved healthy food and drink purchases in association with income management.^{15,16} In 2009, of 66 store operators interviewed by the Australian Government, 63.6% reported an increase in store sales with income management, while one-fifth (20.6%) reported a decrease.¹⁵ We found that store sales increased markedly in association with the government stimulus payment, but showed no change with income management independent of the stimulus payment.

Furthermore, our study showed that across 10 stores in the NT, income management had no effect on fruit and vegetable sales or turnover, contrary to results reported in official reports.^{15,16} The average daily turnover of fruit and vegetables throughout the 18-month income-manage-



ment period was about 152 g per person. This is a low per capita turnover, despite ALPA supporting a nutrition and health strategy and eliminating the freight cost on the mark-up of fruit and vegetables.

Consistent with those reported by the government, our findings indicate that income management has had no effect on the sale of tobacco products. The sale of tobacco products through the 10 study stores in the 18-month income-management period accounted for about a quarter of total food and drink expenditure and was four times that of fruit and vegetable sales.

A reduction in the level of soft drink sales and in the volume sold occurred in the first 4–6 months of income management. There also appeared to be a reduction in sales during this period for all other products for which sales were restricted through the use of the ALPA FOODcard, such as confectionery, crisps and pies (data not reported). After the first 6 months of income management, both soft drink and confectionery sales continued at a rate higher than before income management. Two likely explanations for this downward trend in sales occurring immediately after the introduction of income management and then increasing thereafter are: (i) the restrictions on the ALPA FOODcard influenced people's spending temporarily but, over time, people adjusted and found alternate means to purchase restricted items; and (ii) the removal of the ALPA FOODcard through the introduction of the BasicsCard removed all such restrictions.

Tobacco use (17%), and high body mass (16%), physical inactivity (12%) and high blood cholesterol (7%), in all of which diet plays an important role, contribute 52% of the health gap reported for Indigenous Australians compared with non-Indigenous Australians.¹⁷ In addressing the health gap, effective strategies are needed to restrict tobacco use and to encourage healthy eating for people in remote communities, including increasing people's consumption of fruit and vegetables and decreasing their soft drink consumption. It is unlikely that mandatory management of people's income will lead to purchasing of more fruit and vegetables when issues of availability, quality, affordability and home storage remain key issues. This is contrasted with the impact of the government stimulus payment on sales of all store commodities, including fruit and vegetables. Our data cannot be used to ascertain the relative merit of a budgeting

tool such as the ALPA FOODcard or additional income on positively influencing people's spending, but these initiatives do indicate the existence of confounders that need to be considered in assessing the impact of income management on store sales.

Our study has several limitations to the extent to which the findings can be generalised to other remote communities in the NT. First, the 10 stores included in the study were managed by ALPA, so the vehicle for income management (the FOODcard) differed from that used in other communities where government-prescribed minimum standards need to be met in order to benefit from income-managed funds. This difference relates to the restrictions on the FOODcard. In all other respects, the stores are expected to be similar to other community stores in areas where government-prescribed standards apply and where income management has taken effect. Secondly, in communities where the NTER has restricted or moderated people's access to alcohol, income management may impact on store sales differently to our findings in this study in which eight of the 10 study communities were prescribed "dry" (ie, no consumption or sale of alcohol allowed in the community) before the NTER.

The government's aim in introducing income management is to ensure that people receiving welfare payments use this money in a government-prescribed "socially responsible" way, and in a way that makes money available to "feed, clothe, house and provide for the education of their children".¹⁸ Our findings suggest that income management may not be associated with healthier food and drink purchases, and may be having no effect on tobacco sales.

ACKNOWLEDGEMENTS

We are grateful to Robyn Liddle for providing expertise and intellectual input in database design and application; ALPA, and particularly the store managers who helped with data checking; and Professor Kerin O'Dea for her comments on the manuscript. Julie Brimblecombe is supported by a National Health and Medical Research Council Public Health Postdoctoral Training Fellowship.

COMPETING INTERESTS

Julie Brimblecombe was commissioned by the ALPA to undertake a preliminary study that was later extended to include the 10 communities in this study.

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(Received 27 Jan 2010, accepted 31 Mar 2010) □

Shorty Jangala Robertson (See page 572)

