

2019

**INVESTIGATION INTO THE COST
DRIVERS
IN MALARIA PROGRAMME IN LIMPOPO
DEPARTMENT OF HEALTH: MOPANI AND
VHEMBE DISTRICTS**

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Summary

The Performance Expenditure Review has its focus on the identification and analysis of cost drivers in the malaria control implementation plan. The review covers the periods 2015/16, 2016/17 and 2017/18 financial years. The focus of the review covers both financial and non-financial performance information.

The expenditure trends for the period have a positive relationship with the non-financial performance. This is evidenced by the fact that when spraying was high in 2015/16 also the overall spending was high and whereas the spraying activity dropped in 2016/17 the costs also behaved in a declining way. In 2017/18 when there was an outbreak of malaria, it was accompanied by the escalations on the direct costs other than the compensation of employees. The key cost drivers of the programme are salaries and wages, security services and fumigation.

Over the 3 financial year period malaria transmissions fell from 1.04% in 2015/16 to 0.84% in 2017/18. The same period was characterised by a rise in malaria infection cases from 1538 to 18977.

The options considered were whether to outsource the transportation portion of the programme, whether to equip the malaria camps with digital equipment to reduce the security warm bodies, or whether to move the malaria camps to other facilities and whether to outsource the whole programme. It became evident that the viable options are on the basis of efficiency. The malaria camps (some especially with temporary structures) also should be closed and migrated to within nearest clinics or other government institutions. The migration could bring savings on municipal services as well security services estimated around R3.4 million.

The conclusion is made that the programme is core to the quest to the national strategy to eliminate malaria transmission in the country. From the perspective of this PER, efficiencies can be applied in rendering the malaria prevalence control with fewer resources through cutting of some expenditure of cost drivers such as security services. Furthermore it is observed that the compensation of employees costs are not avoidable and the model of combining temporary and permanent staff provide stability of expenditure versus the services.

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provincial government is expected to cut the compensation of employees cost by about 2 percent. Malaria prevention is a labour intensive programme as officials are required to visit villages all over the districts to render the spraying services. Therefore the policy choices are even harder as the department is expected to fund other primary health care services programmes. I have chosen this topic to find out the cost drivers (referred herein as expenditure buckets) in running the programme. Specifically I want to find out if it is compensation of employees, materials or other activities? The beneficiaries of this programme are households in the 2 districts mentioned herein. Primarily, the Basic Accounting System (BAS) data was used to construct the report. Also performance data was utilised from the Annual Performance Plan and Annual Report (AR). The financial data are retrieved from the BAS central main frame and therefore validated whereas the APP and AR data are as per official Departmental reports.

2. Policy and Institutional Information

The Malaria Programme policy Design is done at National Department of Health with inputs from provinces. The national Department of Health has developed Malaria elimination plan with a target of removing completely it by about 2020. The Department of Health (NDoH) has constituted the South African Malaria Elimination Committee (SAMEC) to specifically run the strategy. Currently the strategy is being applied both at preventative and curative level. This is due to the fact that outbreaks are still getting experienced.

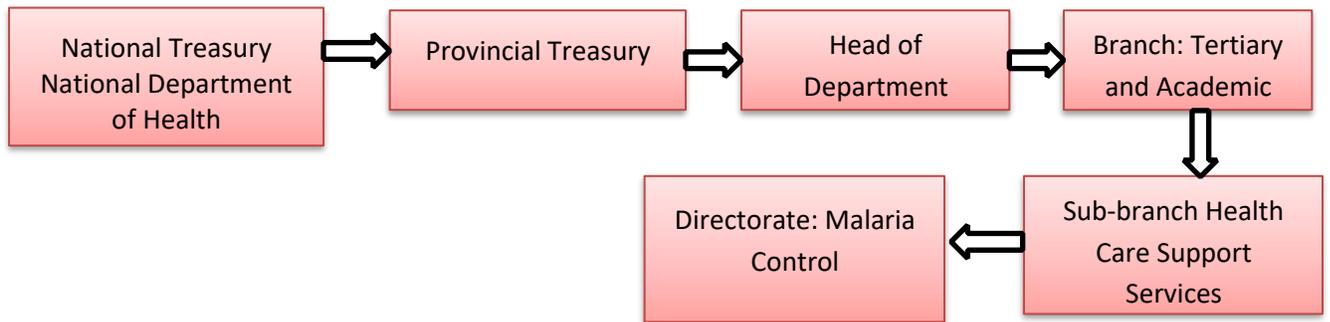
“ Achieving the ambitious target of malaria elimination depends on all healthcare workers in malaria endemic and non-endemic areas optimising their management of malaria cases, including 1) encouraging early treatment seeking within 24 to 48 hours; 2) maintaining a high index of suspicion to ensure prompt diagnostic testing of all patients with malaria symptoms who are resident in, or have recently travelled to, a malaria area; 3) in those who test malaria positive, assessing disease severity and starting effective treatment immediately depending on disease severity; 4) notifying each and every case (including all imported cases in non-endemic areas) and 5) monitoring adequacy of response to treatment” (NDoH 2018:12).

The implementation programme is done at (provincial) Department level with much involvement of the branch head, but driven from the Chief Directorate Health Care support and Directorate Malaria Control.

The focus of this performance expenditure review is on the cost drivers in the delivery of Malaria Programme in Limpopo department of Health. The Malaria programme is a vertical programme in the Department which runs in Tzaneen Town in the province. The purpose of making it a vertical programme was to make decision making process fast so that there are no delays caused by many layers of reporting. The programme is headed by a Director based within the Institute in Tzaneen. However a Chief Directorate is responsible for the major decision making. The approach to this review is on the details of the programme as demonstrated in activities generated from implementation programme. The decisions flow of the programme can be reflected as follows:



The funding flow of the programme is as follows:



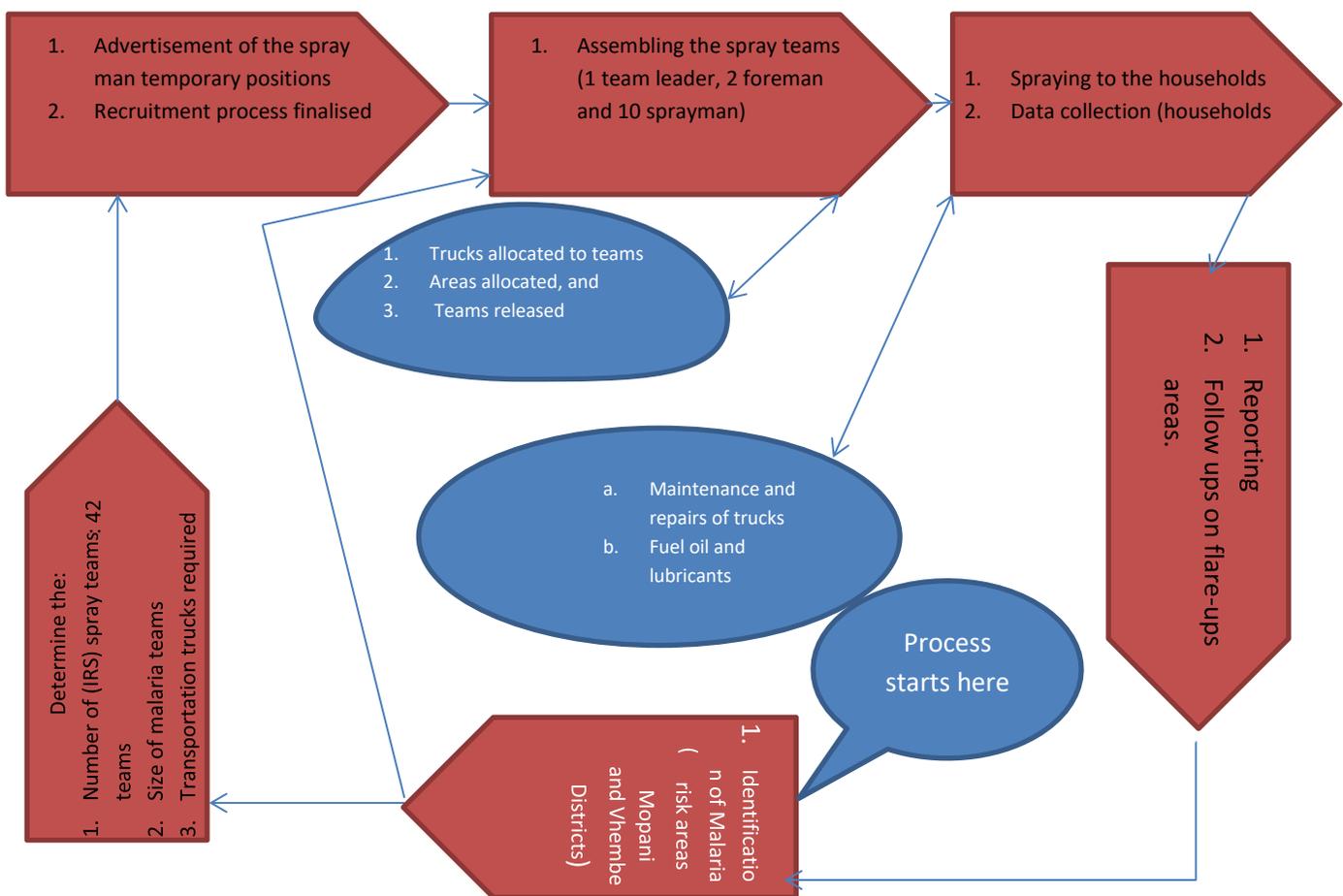
The funding of the programme is predominantly Equitable Share. The allocation is done through the budget bidding process with other programmes in the Department. The allocation is made on the strength of the bid and the available funding for the department as a whole. In 2017/18 financial year, a once-off malaria control conditional Grant was appropriated to deal with the upsurge of malaria prevalence in the province. The Directorate Malaria control assumes the duty of implementing the programmes with immediate powers of monitoring and evaluation. The budget utilisation is also the responsibility of the Directorate Malaria control whereas the overall monitoring and control in terms of the legal framework is centralized at the Budget office at Head Office (the CFO's Office). The key influencers in this implementation programme are Compensation of Employees (due to the programme being labour intensive) and well as operating costs.

3. Programme Chain Delivery

The Malaria implementation programme is a labour intensive exercise. It therefore requires a lot of workers for its successful implementation. Malaria transmission in South Africa is seasonal, with malaria cases starting to rise in October, peaking in January and February, and waning towards May (NDoH). Because of the seasonal nature of malaria prevalence, the Department has existing permanent as well as temporary staff. The temporary staff is employed in August every year with their contracts ending in February the following year. The system is driven through a team approach. The Teams are comprised of the team leader (usually doubling as a driver), foreman as well as the sprayman. The total count of an ideal malaria spray team is about 13 employees. However due to the shortage of staff owing to financial constraints, the teams are constrained to about 3 to 5 people. There are 42 spraying teams in the province that get deployed in the spraying campaigns.

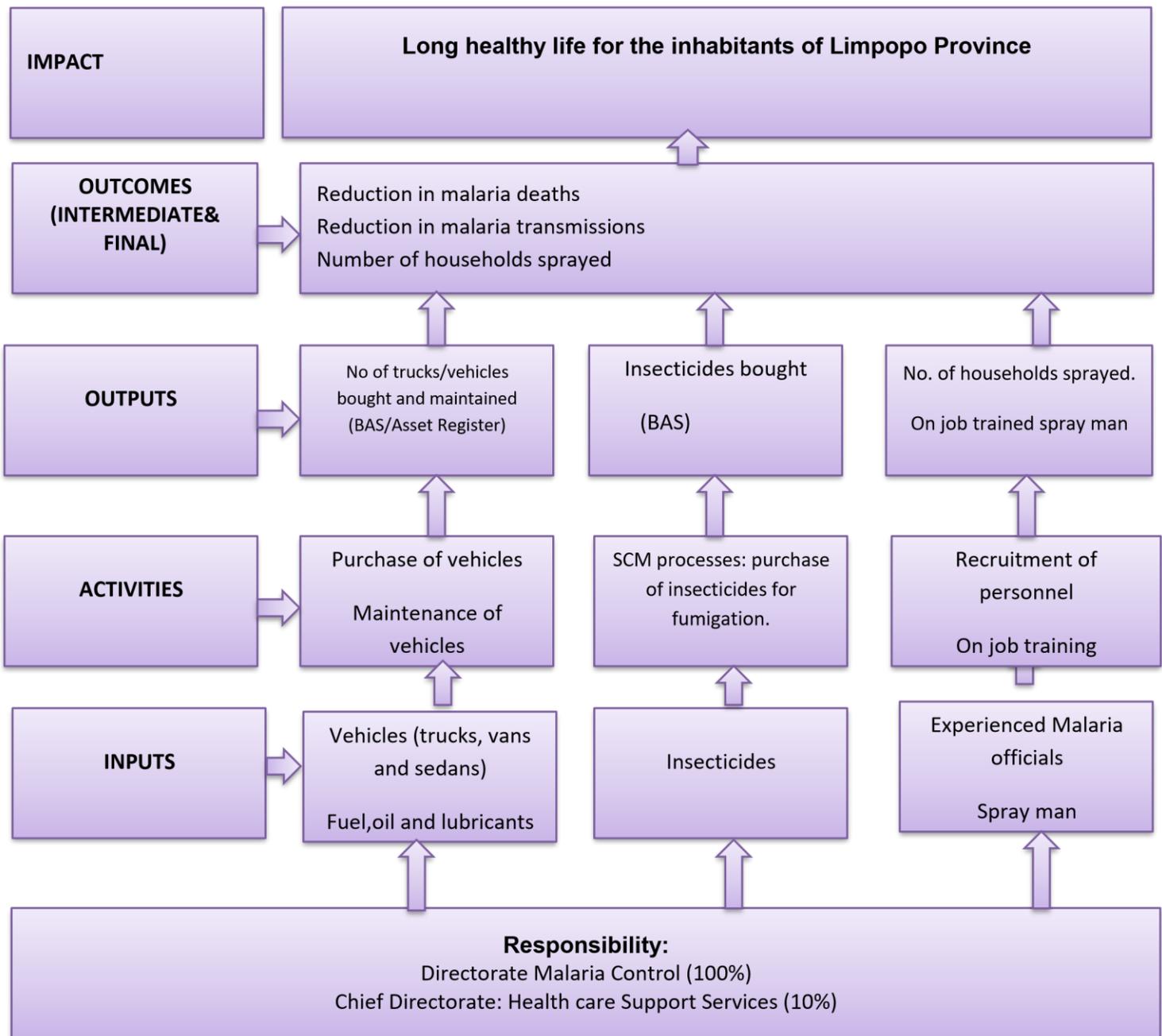
The chain delivery of the implantation programme at Malaria Control Directorate can be depicted in terms of diagram 3.1.

Diagram 3.1 Process flow of Malaria control activities



The programme is designed to reach the highest possible number of households in the 2 districts under the exercise. The key inputs to reaching this goal are mainly human capital, trucks (vehicles), insecticides and necessary skills.

The objective of running the programme can be schematically demonstrated by the diagram 3.2:



4. Performance Issues

Malaria transmission/prevalence has shown a stable decline in the last financial years. The trend however got disturbed by the sudden upsurge in 2017/18 financial year. The National Department of Health's target strategy to eliminate it by 2020 was as a result slowed down.

The success of the programme is measured by the number of the households sprayed, cases reported as well as the related death cases recorded. For the purpose of this exercise more

emphasis is put on preventative herein reflected through spraying activity. Table 4.1 depicts the performance information for the years under review.

Table: 4.1. Performance information

Activity	FINANCIAL YEARS		
	2015/16	2016/17	2017/18
Annual	1.04% (1538 0.94%(38 deaths of 4055 0.84%(18977Cases, 160 Cases, 16 Deaths	cases)	Deaths)
Total structures/households targeted for spraying	791,029		656,392
Total structures/households sprayed	739,571		
Total structures/households sprayed	771,674		521,142
Percentage of actual performance on sprayed household vs the targeted households	682,687		
	98%	79%	92%

It would seem from the data provided that there was a relaxation in spray coverage in the 2016/17. This shows a decline of 19% or 250,532 households from 2015/16 to 2016/17. The trend improved from 79% in 2016/17 to 92% in 2017/18 (521,142 to 682,687 households). It is possible to this performance outcome with the subsequent escalation of cases recorded in the 2017/18 financial year. Despite this escalation, the percentage of recorded death has decreased from 1.04% in 2015/16 to 0.84% in 2017/18. The prevalence in numbers has increase from 38 deaths of 4055 cases to 160 of 18977 cases. It therefore follows that there could be no substitute for continued IRS application year after year. The performance information also reflects that with continued IRS application it is likely that the goal of the National Department of Health of eliminating the malaria transmission could be close to reality.

A the spraying activity declined from 2015/16 to the 2017/18 the vacancy in the key personnel that that directly deal with it. The decline in the spraying activity is also reflected in the staff complement at the directorate or institution. Staff complement declined on the same period, as evidence that the campaign is labour intensive. The same period of quantum decline in spraying is accompanied by a decline in fumigation, fleet services, consumables and maintenance expenditures. The overall expenditure growth for the whole 3 year period is well below inflation, hence the decline in spraying activity. The funding problem can be attributable to the decline in the spraying campaign thereby allowing the escalation of malaria prevalence.

Table 4.2 is provided herein to demonstrate the critical staff compliment during the 3 financial years. The picture provided through the table suggests that from 2015/16 to the 2017/18 financial year, there has been a downward trend in terms of the number of key employees in the programme. The exiting staff was not getting replaced.

Table 4.2 Filled vs unfilled Critical Officials for Malaria spraying campaign (permanent)

HR For each financial year	Critical Officials	15/16	16/17	17/18
	Team Leader	37/69	34/69	31/69
	Foreman	40/84	38/84	44/84
	Spray Officials	163/205	144/205	118/205

5. Expenditure Observations

The expenditure has been presented at budget level to ensure that they are as close to the services activities as possible. It therefore means that ledger items are contained therein.

Table 5.1: Expenditure trends on Malaria Programme 2015/16 to 2017/18

Row Labels	2015/2016	2016/2017	2017/2018	Grand Total	Growth rates		
					16 17 YoY%	17 18 YoY%	CAGR
Salaries and wages	79,683,873	79,933,507	80,558,982	240,176,361	0.3%	0.8%	0.5%
Fumigation	3,700,049	2,996,433	7,122,316	13,818,798	-19.0%	137.7%	38.7%
Safety and security	3,236,849	3,958,832	3,301,705	10,497,386	22.3%	-16.6%	1.0%
Fleet Services-Repairs and maintenance	3,421,229	2,017,514	269,152	5,707,895	-41.0%	-86.7%	-72.0%
Other	1,481,221	1,387,326	1,845,666	4,714,213	-6.3%	33.0%	11.6%
Leave gratuity	1,120,723	1,862,714	1,390,092	4,373,529	66.2%	-25.4%	11.4%
Domestic travel	1,060,388	990,504	783,357	2,834,249	-6.6%	-20.9%	-
Inventories			2,645,147	2,645,147	#DIV/0!	#DIV/0!	14.0%
Information and Communication Technology	239,554	253,204	356,627	849,385	5.7%	40.8%	22.0%
Fleet Services-purchases	264,437	358,370	-	622,807	35.5%	-100.0%	-
Household inventories and consumables	199,497	129,609	278,449	607,555	-35.0%	114.8%	18.1%
Leases	78,050	79,343	88,309	245,702	1.7%	11.3%	6.4%
Fleet Services-LicensesLaboratory consumables and services	68,010	67,536	79,176	214,722	-0.7%	17.2%	7.9%
Hardware and accessories	4,742	9,675	53,839	68,256	104.0%	456.4%	237.0%
Maintenance	13,475	5,580	2,830	21,886	-58.6%	-49.3%	-54.2%
ICT	51,394	18,290	-	69,684	-64.4%	-100.0%	-
	75,026	113,252		188,278	51.0%	-100.0%	-
Grand Total	94,698,517	94,181,691	98,775,646	287,655,854	-0.5%	4.9%	2.1%

The Expenditure trends on the programme shows a mild movement from year to year. There is a 0.5% decline from 2015/16 to 2016/17 financial year (94.7 million to R94.2 million). This is followed by a 4.9% increase in 2016/17 to 2017/18 financial years (R98.2 million to R98.8 million). On average basis the expenditure growth is reflected at 2.1%. The cost drivers reflected on Table 4.1 for the 3 year period are Salaries and wages, fumigation, safety and security and fleet services. These cost drivers are likely to have a continued positive relationship as the programme is labour intensive. The costs of safety and security is due to the fact that there are malaria camps throughout the 3 districts and therefore security services personnel are deployed to guard them. This expenditure grew by 22.3% from 2015/16 to 2016/17 financial years before dropping by 16.6% from 2016/17 to 2017/18 financial years. The fleet services expenditure is mainly the maintenance of Motor vehicles as opposed to purchases. This is in line with the situation that there are 46 trucks for IRS services with an average age of 10 years. The vehicles are in full utilisation from August to about March of each financial year where the programme is running at full strength. The utilisation of vehicles reduces during the low months of activity such as from April to July of each financial year. Also of interest is the continued payment of leave gratuity. This is an indication that most of the spray man are old and are exiting the system with no immediate replacements.

Table 5.2: Analysis of Compensation of Employees

	FINANCIAL YEARS						
	2015-16		2016-17		2017-18		TOTAL
	HEAD COUNT	EXPENDITURE R'000	HEAD COUNT	EXPENDITURE R'000	HEAD COUNT	EXPENDITURE R'000	
SALARIES AND WAGES							R'000
Foremen and Team leaders	77	17,546	71	18,470	75	19,442	55,458
Permanent Spraymen	116	19,398	113	20,419	116	21,494	61,312
Temporary Spraymen	123	14,291	115	9,331	95	9,702	33,324
Total expenditure on core staff	316	51,236	299	48,220	286	50,638	150,094
% Share of Core Staff for Spraying services		64.3%		60.3%		62.9%	62.5%
Total Other (Expenditure on non core staff)		28,448		31,714		29,921	90,083
% share of other officials (Director, scientists, Deputy directors and other Adminstraion staff).		35.7%		39.7%		37.1%	37.5%
Total expenditure for the Programme		79,684		79,934		80,559	240,177

Due to the fact that the expenditure on compensation of employees accounts for 83.5% of total accumulated expenditure, it is therefore necessary to zoom into its details. It is clear from table 5.2 that 62.5% or R150.1 million of total compensation of employment expenditure (R240.2 million) is attributable to the service being reviewed. The remaining portion is attributable to

support and other related employees in the programme. Included in the other expenditure portion is the scientists, environmental officials, head of the malaria programme and Director Malaria control (a portion of their time is spent on determination, planning and monitoring the campaign). It is therefore clear that even on this non core expenditure, it is possible to estimate that a further 15% or R36.0 million can be apportioned to the direct action on prevalence control. The outright support staff such as transport officer, Human Resources staff, finance as well as grounds and maintenance staff can therefore contribute the remaining 22.5% or R54.0 million of the total compensation of employees expenditure. It is therefore possible to argue that much of the expenditure on compensation of employees occurred in the function of malaria control.

5.3: Analysis of the vehicles maintenance

The Department spent R3.4 million, R2.0 million and R0.3 million in 2015/16, 2016/17 and 2017/18 respectively on the maintenance and repair of vehicles attached to the malaria programme. The expenditure is apportioned on a vehicle category basis and not per vehicle. This approach therefore required that assumptions be developed on which analysis will be based. Due to the activity and vehicle category variation, the apportionment percentages have been applied as 65% for trucks, 17% for light delivery vehicles (LDVs), 5% for sedans, 12% for double cabs and 1% for trailers.

Table 5.3. Vehicles maintenance and repairs

Vehicle Category		Actual Expenditure				Cummulative total
		2015/16	2016/17	2017/18		
	Number	Apportion- Apportionment in ment in % Rands	Apportionment Apportion- in % ment in Rands	Apportion- ment in ment in % Rands	Total	
Total Expenditure		100% 3,421,229	100% 2,017,514	100% 269,152	5,707,895	
Trucks	46	65.0%	65.0%	65.0%		
LDV's	30	17.0% 2,223,799	17.0% 1,311,384	17.0% 174,949	3,710,132	
Sedans	3	5.0% 581,609	5.0% 342,977	5.0% 45,756	970,342	
Double Cab	21	12.0%	12.0%	12.0%		
Trailers	2	1.0% 171,061	1.0% 100,876	1.0% 13,458	285,395	
		410,547	242,102	32,298	684,947	
		34,212	20,175	2,692	57,079	
Total	102	200.0% 3,421,229	100.0% 2,017,514	200.0% 269,152	5,707,895	

From the presentation in Table 5.3, the trucks, trailers as well as the LDVs are generally fully utilised for the spraying campaigns. This therefore means that the expenditure for these 3 categories are classified as direct expenditure. The remaining expenditure can be classified as overheads (although a portion of their use is for monitoring the campaign and therefore include direct costs). It can be said therefore that 83% or R4.7 million of the total R5.7 million incurred for the entire 3 year period is attributable to malaria campaign. Only 17% or R0. 930.3 million is attributable to the non-core activities.

Matching the expenditure incurred against the total households there is an indication that the unit cost dropped from R3.68 per household in 2015/16 to R0.33 in 2017/18. This picture shows that there is a direct relation between cost of maintenance and repair with the spraying intensity performance (as spraying increase so does maintenance and repair costs). When the spraying activity dropped from 772 thousands in 2015/16 to 683 thousands in 2017/18, the cost of maintenance and repairs also dropped from R2.8 million to R0.2 million respectively. However the actual expenditure in 2017/18 shows that some invoices for vehicle maintenance and repairs would have been withheld due to budget pressure. In this prevailing circumstance, however it is clear that the number of households sprayed have a direct positive influence on the expenditure on maintenance and repairs of vehicles. This therefore indicates that when more households are visited for spraying purposes, more kilometres are incurred and therefore costs associated with such travelling. Table 5.4 is provided to show the relationship between the spraying performance and the costs incurred during those visits, including the unit cost of each household.

Table 5.4. Spraying Performance vs vehicles maintenance

Vehicle Category	2015/16	2016/17	2017/18	Cummulative total
	Apportionment in Rands	Apportionment in Rands	Apportionment in Rands	Total
Trucks	2,223,799	1,311,384	174,949	3,710,132
LDV's	581,609	342,977	45,756	970,342
Trailers	34,212	20,175	2,692	57,079
Total Direct Expenditure	2,839,620	1,674,537	223,396	4,737,553
Households	Headcount	Headcount	Headcount	Headcount
Total household sprayed	771,674	521,142	682,687	1,975,503
Unit cost per household	3.68	3.21	0.33	2.40

Expenditure analysis conclusions

From the analysis, observations and presentations provided herein it is possible to draw the following expenditure conclusions on major items:

- I. That the programme's success is inherently labour intensive. This is demonstrated by the fact that compensation of employees expenditure directly related to the campaign is very high at 62.5% or R150 million of a total of R240 million.
- II. That fumigation chemical is also key at R13.8 million allocated at 100%.
- III. Vehicle maintenance and repairs is also high at 83% or R4.7 million of the all inclusive maintenance and repair costs of R5.7 million.

Trucks	46	10	108,840	10,884 500,664	166,888	166,888	166,888
LDV's	30	10	155,198	15,520	155,198	155,198	
				465,594			155,198
Trailers	2	22	40,000	1,818	1,212	1,212	
				3,636			1,212
Total	78	14	101,346	28,222 969,894	323,298	323,298	323,298
Maintenance and repairs cost incurred				4,737,553	2,839,620	1,674,537	223,396
Cost per km				4.88	8.78	5.18	0.69
FleetWatch (3 ton) truck operating benchmarks (2017)					11.68	11.68	11.68
Variance				6.80	2.90	6.50	10.99

On security services, the Department can improve the security systems across the malaria structures. This may have only high set up costs but very few security personnel. The Department can also move malaria camps to other facilities in the province, e.g. hospitals, clinics, health centres as well as any other government property so that there can be sharing of costs. The 99.4%/0.6% other facilities/malaria camps expenditure apportionment formula is applied as a proposal which can create some savings. The apportionment is based on the total expenditure incurred for the department on security services including malaria. Table 6.2 is presented to demonstrate the apportionment assumptions as well as the application thereof.

Table 6.2. Option to integrate malaria camps into other facilities

Item	2015/16	2016/17	2017/18	Total
	R'000	R'000	R'000	R'000
Total Expenditure for security services for the Department	322,879	369,112	489,890	
Apportionment of security to other facilities @99.4%	320,942	366,897	486,951	

Apportionment of security to malaria camps @0.6%	1,937	2,215	2,939	
Security services paid in malaria	3,237	3,959	3,302	10,497
Less: Apportionment amount per proposal	1,937	2,215	2,939	7,091
Possible saving	1,300	1,744	362	3,406

The other option could be to outsource the whole programme. This option however may not be able to curb expenditure to zero during low season as even in off season periods spraying is usually continuous albeit at a slow rate.

7. Recommendations

Based on the information contained herein as well as the observations it is possible to render the following recommendations:

- a. That the department continues with the same model of malaria prevalence control including purchasing and maintaining trucks. The department should plan well to render disposal of trucks for IRS services so that they don't become too expensive to maintain,
- b. That the Department considers favourably upgrading the security systems in malaria camps/institutions to minimize the number of security personnel onsite. The personnel requirements for onsite security are more expensive than when the digital equipment are installed as fewer officials will be requirement to render the service.
- c. The Department move malaria camps to established institutions in the department and other government facilities to share costs for security services. This has a potential to save an amount of about R3.4 million. The movement of these camps will also cause other expenditures such as municipal services and telephone to decrease. This option is highly desirable.

8. Action

On the basis of the recommendations and practicality considerations, it is feasible to propose the following actions:

- a. The feasibility of moving malaria camps to established institutions could be started in a month's time.
- b. Movement of the camps to hospitals and other institutions in the department could be done within this financial year.

Annexures

- a. Log-frame
- b. Expenditure report
- c. National Malaria Elimination Strategy
- d. Truck Operation Benchmarks