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A Cost Analysis of Rheumatic Fever Management in Jamaica, 2012 to 2018

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ABSTRACT

Background

Introduction: Jamaica's burden of Acute Rheumatic Fever (ARF) and sequelae like Rheumatic Heart Disease (RHD) have declined significantly since introduction of the WHO prevention programme in 1984 and has resulted in reduced expenditure in prevention and control. This research aims to determine direct costs of Rheumatic Fever (RF) events, compare them to expenditures recorded in the literature, and assess recommendations for investment and prioritization.

Methods

A national cross-sectional survey was conducted to estimate inpatient, outpatient and prevention costs for each of four RF groups (ARF, RHD with and without heart Failure, and Carditis). Medical records were accessed for all patients recorded in the Hospital Active Surveillance Registries (2012 to 2018) from five major regional and specialist hospitals. Relevant data were abstracted using an internally developed, pretested tool. Categorical costs were calculated using the average number of units used per sub-category (e.g. registration, room and board, consumables, tests, medications) and multiplied by National Health Service fees.

Conclusion

From 156 reports of ARF/RHD, 74 patients were identified as suspected or confirmed, of which 44 had demographic information: 58.1% were male, and onset of ARF and RHD respectively were at 11.5 (SD 6.9) and 20.8 (SD 12.3) years. The direct country cost of care was US$78,249.88 annually, averaged across all RF/RHD clients. The single most costly component was inpatient admission, of which RHD, then ARF/Recurrent RF were costliest at US$695.30 and US$605.28 respectively. Secondary prophylaxis costs US$56.42/patient/year (US$36,189.16 nationally/year) in optimal circumstances, and US$49.12 at the actual 67% compliance rate. At US$4.78/case, the annual cost of pharyngitis management for at-risk 0-15 years olds was US$159,377.11.

Interpretation

Previous local data suggests that the total cost of care of RF conditions has fallen significantly since prevention programme initiation. Adjusted for government subsidy, Jamaica's direct ARF inpatient costs (US$2,421.12) are comparable to the WHO-CHOICE inpatient estimate (US$2,225.57). These further approximate if local meal costs are excluded as CHOICE estimates do. We believe the changing epidemiology of RF warrants prioritization for pre- and peri-natal RHD care, compliance boosting activities for prophylaxis, and clinical decision rules with rapid antigen detection tests for targeted point of care diagnosis, all in keeping with global recommendations.

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INTRODUCTION

The Acute Rheumatic Fever (ARF) spectrum, including Rheumatic Heart Disease (RHD), still has significance worldwide, disproportionately affecting developing countries and certain ethnicities.[1,2] In 2019, of the approximately 470,000 new cases of ARF occurring annually, and an estimated 40.5 million people affected by RHD, 73% of cases occur in five countries (India, China, Pakistan, Indonesia, Democratic Republic of Congo).[3] Furthermore, the highest age-standardized death rates are concentrated in Oceania, South Asia, and central sub-Saharan Africa.[4] In the 1990-2019 Rheumatic fever (RF) era, the Age-Standardized Incidence of RHD has increased globally, more so in low and middle income countries (LMIC).[5]

Despite this, current investment in national programmes has been low by comparison to other diseases, and RF is considered a neglected disease, with loss of interest from academic, government and civil society perspectives.[6,7] The reduced investment and interest was recognized at the 2017 World Health Assembly (WHA) 141st session which adopted resolution *EB141.R1 on Rheumatic Fever and Rheumatic Heart Disease.* (8) This resolution was a call to member states to foster increased international collaboration and resource mobilization in using all available channels for disease prevention and control.[8] Concurrently, the 71st WHA set standards for quality improvement and progress of the RF programme through improvements in diagnostics, RF in pregnancy, and secondary prophylaxis, among other recommendations.[9]

In Jamaica, this sparks questions around the current financial burden of disease at an individual and national level; is there an indication for a programme de-escalation according to our epidemiological standing? Is there a need to increase investments to meet WHA goals?

Jamaica's incidence of ARF has fallen to levels comparable to developed countries, in which low disease incidence and prevalence have indicated removal of health promotion, surveillance/notification, and/or registry management as formal components.[10,11,12,13] New Zealand and Cuba even discontinued the formal prevention programme entirely.[14,15] The only data that we could locate for the cost of care in Jamaica dates back to 1985 when the annual cost of Rheumatic admissions was estimated at US$337,520 annually (for 1,079 admissions over a six-year period at just one of Jamaica's health institutions).[16] In 2018, Jamaica recorded only three admissions at that same hospital for the preceding six-year period.

Yet, what can Jamaica and Jamaicans afford, and how does primary prevention through treatment of Group A Streptococcal throat infection (Strep throat) compare cost-wise to secondary prevention of recurrent RF or RHD through regularly scheduled prophylaxis? Brazil gives us one of few available country comparisons; here RF costs the affected family US$97/patient annually and costs society US$320/patient annually, whereas a secondary prevention programme cost US$23/patient annually.[17] A 2020 Ugandan study revealed combined direct and indirect costs average US$78/patient per year, US$32.45 of which are direct costs of medications, investigations and consultations.[18]

This information gap and decline in ARF and RHD in Jamaica warrant an evaluation of intervention costs for affected patients, and is necessary to reduce undue expenditure, and determine the priorities, scope and direction of programme investments. This is consistent with the 2017 WHA resolution, and may include an increase in the programme budget for primary and secondary prevention optimization, development of local capacity for patients requiring intensive care, partnering with established offshore care centres, and expanding social support programmes to include subsidies for families affected by RF.

Methodology

This cross sectional, national study was conducted in the island of Jamaica. Medical records were accessed for all patients recorded in the Hospital Active Surveillance Registries (2012 to 2018) from the Kingston Public Hospital, Bustamante Hospital for Children, University Hospital of the West Indies (UHWI), Cornwall Regional Hospital, and St Ann's

Bay Hospital. Data related to Rheumatic inpatient and outpatient events were abstracted using the In-patient and Outpatient Cost of Care Abstraction Tools.

A cost calculation methodology was applied for in-patient services (admissions) and for outpatient services (non-admission casualty visits, internal medicine outpatient department (OPD) clinical visits). Despite the abolition of user fees in 2007, a fee structure is still in place for accounting purposes and all costs are included in the registration/ doctor's visit fee schedule.[19] Costs of prophylaxis OPD visits for 28-day benzathine penicillin G (BPG) injections and dispensing of oral medication were calculated based on the assumption that the overhead and sundry costs (staff time-weighted salary, injection needles, syringes, cotton and alcohol for site cleaning, water for injection, documentation stationary) of each visit was included in the registration costs. Additional costs include those for the penicillin, indicated referrals and additional laboratory investigations.

Ethical approval was received from the Ethics Committees of The University of the West Indies and of the Southeast Regional Health Authority (SERHA) prior to data collection. No patients were recruited, only secondary data was used. There was no funding source for this study.

Data collection was conducted by the principal researcher, between June 1, 2021 and April 30, 2022. A list was prepared for each of the six hospitals to locate medical records for all patients reported for 2012 and 2018. Communication was made to the senior directorate of each Regional Health Authority and hospital of interest, and a schedule was established for onsite review of medical records, as well as ARF/RHD admissions recorded by each hospital's registry for the period. A tool that was developed and pretested for this study was used to abstract information according to In-patient and Outpatient (internal medicine outpatient department (OPD), non-admission casualty) visits. Therefore, cost calculation methodologies were applied as either in-patient, outpatient or prophylactic services. Casualty visits were counted as admissions if time between arrival and discharge exceeded 24 hours. Prophylactic visits were defined as scheduled appointments used solely for the purpose of routine penicillin administration or collection of oral prophylaxis prescriptions. This differentiated them from OPD visits or appointments initially intended for prophylaxis, in which further testing, or intervention was deemed necessary during the visit.

To cost inpatient events, the number of administrative, supportive, diagnostic, medication and intervention units were recorded for each admission and multiplied by the unit cost as listed in the National Health Service (Fees) (Amendment) Regulations 2009 (NHSF).

Unit costs were calculated from the 2012 National Health Fund medication costs list. Medication prices were used as is for the 2012 to 2018 block and were not adjusted based on the year of admission. Pill use per day was calculated according to the recommended frequency of each medication, and duration was calculated based on the observed use: for antibiotics, prescribed courses was applied and completed; for the other groups, courses were applied for all days of admission and consequently, the mean admission duration calculated for each Rheumatic event was used as the multiplier in calculating the admission cost per drug. The number of drugs per group used by each patient was recorded as an integer (1, 2, 3 etc.) and the schematic in Table 1 used was to extrapolate the cost per group. Invariably, medications were used in order of levels such that the schematic was representative.

Outpatient cost of care was calculated likewise using a similar internal abstraction form that quantified supportive, diagnostic and intervention units with associated costs from the NHSF and the 2012 National Health Fund medication costs list. We assumed that a ratio of outpatient visits to admissions could be used to determine the number of outpatient visits (unknown variable) among admissions (known variable). The formula of "ratio x annual admissions x cost of outpatient visit" was used to extrapolate national annual outpatient costs **(Table 1).** These ratios were used to calculate annual units of outpatient visits and costs, since census data is available for admissions from the RF registry.

Table 1: Medication Groups Used for Treatment of Rheumatic Events by Level of Application According to Case-by-Case Severity/Applicability

Group	Level	Drug name	Dose/ per course	Dose (Ja$)	cost	Dose (US$)	cost
Anti-Inflammatory	Primary	ASA (324mg)	ADx4	0.41		0.003	
	Secondary	Prednisone (50mg)	ADX4	11.08		0.09	
	Tertiary (<12yo)	Paracetamol 125mg/5ml	ADx160*	0.45		0.003	
	Tertiary (>11yo)	Paracetamol (500mg)	ADx6	0.90		0.01	
Antibiotic	Primary	Penicillin	ADx1	170.40		1.31	
	Secondary	Amoxicillin-Clavulanic acid	14	44.30		0.34	
	Tertiary	Ceftriaxone (1g)	ADx1	118.17		0.91	
Cardiac	Primary	Captopril (25mg)	ADx2	1.73		0.01	
Diuretic	Primary	Furosemide (Amp)	ADx1	102.58		0.79	
	Secondary	Furosemide (40mg)	ADx2	1.00		0.01	
	Tertiary	Spironolactone (25mg)	ADx2	34.16		0.26	

Certain diagnoses (Kawasaki disease, Infective Endocarditis) were included in the analysis as patients were investigated and managed as ARF/RHD and only excluded as such in the discharge diagnosis. Admissions and other visits due to conditions not related to a rheumatic condition, but complicated by it, were considered outside the scope of this research, and were excluded.

Costs of routine prophylaxis visits were calculated based on the assumption that service and supply costs, including staff time-weighted salaries, were included in the registration costs. Visits were calculated as one registration cost plus one penicillin vial per visit, with the ideal number of prophylaxis visits at 13 per year on the 28-day Penicillin cycle.All cases of suspected and confirmed ARF/RHD available in the National RF database and Hospital Active Surveillance registries were included in the analysis, noting that a previously diagnosed patient may have multiple admissions for new or exacerbated RF events. The 2018 annual average of registered patients (1,395) and the total number of injections given (5,894), available from the Family Health Unit in Jamaica's Ministry of Health and Wellness, were used as multipliers in the calculation of the prophylaxis cost for existing patients.Maximum, minimum and average costs were assessed. This was done for four management groups, namely ARF or Recurrent Rheumatic Fever (RRF), RHD excluding heart failure, Carditis, and Heart failure. These groups were determined after data collection when these categories naturally emerged from the data as management groups. Medication costs were calculated by four (4) main drug groups (anti-inflammatory, antibiotic, cardiac, and diuretic) used in ARF/RRF, RHD and Carditis, according to the most used drugs. Missing data was excluded from the analysis, but the percentage missing was negligible for this study. Data was analysed using SPSS version 21 and Microsoft Excel 365. A difference was considered significant if the probability of chance is less than 5% ($p \leq 0.05$).

Results

A total of 56 health records were available for review. For inpatient costing, of 76 visits reported as a RF event, 12 visits were excluded having no association to RF beyond initial notification. These included viral illness/no diagnosis (n=8), labour and delivery (n=2), LRTI (n=1), and SLE nephritis (n=1). The highest admission cost was associated with RHD at US$635.65 in 2012, and US$695.30 in 2018, followed by Acute or Recurrent RF at US$553.36 in 2012 and US$605.28 in 2018. **Table 2** demonstrates

the number of investigations and interventions conducted for each type of visit, plus costs of admission for ARF/RRF, RHD, carditis and RHD-associated heart failure.

Table 2: Estimated Per Admission Cost for Acute Rheumatic Fever, 2012 and 2018.

INPATIENT PARAMETERS		Unit cost	Rheumatic Fever		RHD without HF		RHD with HF		Carditis	
Category	Item	(USD)	Mean ± SD	Cost	Mean ± SD	Cost	Mean ± SD	Cost	Mean ± SD	Cost
Registration	Registration	7.82	1	7.82	1	7.82	1	7.82	1	7.82
Sundries	# IV Fluid bags (estimated)	2.77	9.795	27.11	8.225	22.76	8.165	22.60	8.585	23.76
Room and board	Ward (# days)	0.43	20.59±41.96	8.78	17.45±23.64	7.44	17.33±12.09	7.39	18.17±12.98	7.75
	ICU (# days)	1.83	0.24±1.3	0.44	0.82±3.4	1.50	0±0	0.00	0±0	0.00
Surgery	Major	1.07	0.04±0.19	0.04	0.06±0.25	0.06	0±0	0.00	0±0	0.00
	Minor	4.19	0±0	0.00	0±0	0.00	0±0	0.00	0±0	0.00
Investigations	CBC	11.52	2.03±1.4	23.39	3.05±2.01	35.14	1.67±0.82	19.24	5±2.92	57.60
	ESR	3.38	1.44±0.91	4.86	1.74±1.15	5.88	1.67±1.21	5.64	3.4±1.82	11.48
	Chemistry	0.00	1.72±1.28	0.00	3.05±2.57	0.00	1.83±0.98	0.00	4.2±2.59	0.00
	ASTO	3.43	1.22±1.93	4.19	0.95±0.71	3.26	0.5±0.55	1.72	1±0.71	3.43
	C-reactive Protein (CRP)	2.21	0.97±0.69	2.14	1.33±1.33	2.94	1.67±0.82	3.69	1.4±1.52	3.09
	Other tests (e.g. HIV, immunology)	0.94	1.39±1.26	1.31	1.15±1.6	1.08	1.33±1.21	1.25	2.6±1.52	2.44
	Microbiology	10.61	0.93±1.26	9.87	0.68±0.95	7.22	0.5±0.55	5.31	1.2±1.3	12.74
	ABG	9.43	0±0	0.00	0.18±0.53	1.70	0±0	0.00	0±0	0.00
	X rays	6.49	0.33±0.55	2.14	0.56±0.78	3.63	0.33±0.52	2.14	0.2±0.45	1.30
	ECGs	0.00	0.63±0.49	0.00	0.85±0.59	0.00	0.5±0.55	0.00	0.8±0.45	0.00
	Echocardiograms	13.11	0.57±0.5	7.47	0.65±0.49	8.52	0.67±0.52	8.78	0.8±0.45	10.49
	LFTs	3.34	0.58±0.56	1.94	0.67±0.77	2.24	0.33±0.52	1.10	0.6±0.89	2.00
	Glucose	23.97	0.11±0.32	2.64	0.17±0.38	4.08	0±0	0.00	0.2±0.45	4.79
	Ultrasounds	0.00	0.04±0.19	0.00	0.12±0.33	0.00	0±0	0.00	0±0	0.00

Interventions	Physiotherapy	2.89	0.22±0.97	0.64	0.53±1.5	1.53	0±0	0.00	0.25±0.5	0.72
	Blood transfusions	0.00	0.07±0.38	0.00	0.76±1.56	0.00	0±0	0.00	0.25±0.5	0.00
	Nebulisations	0.27	1.25±5.22	0.34	0±0	0.00	7.33±16.54	1.98	1.75±3.5	0.47
Medications	# Diuretics	2.30	0.25±0.52	0.58	0.95±0.89	2.19	1.67±0.52	3.85	1.2±1.1	2.76
	# Anti-inflammatory agents	6.21	1.03±0.66	6.39	1.3±1.03	8.07	1.33±0.82	8.26	1.25±0.5	7.76
	# Cardiac medications	1.95	0.14±0.36	0.27	0.63±0.68	1.23	1±0.63	1.95	0.5±1	0.98
	# of Antibiotics used (including Penicillin G)	0.00	0.77±0.57	0.00	1.11±0.66	0.00	1.67±1.37	0.00	0.8±0.84	0.00
Other services	Number of ambulance transports done	8.43	0.07±0.27	0.59	0.25±0.45	2.11	0.17±0.41	1.43	0±0	0.00
Cost 2012	US Dollar			553.36		635.65		603.77		564.66
Cost 2018	US Dollar			605.28		695.30		660.42		617.64

For outpatient costing, there were a total of 275 Internal Medicine OPD visits for 35 patients, and 21 non-admission casualty visits for 15 persons. Non-admission casualty and special OPD visit ratios were calculated at 0.33 and 4.3 visits per admission respectively. These ratios were used to calculate annual units of outpatient visits and costs, since census data is available for admissions from the RF registry. Prophylactic management was estimated at US$73.68 per person per year in optimal circumstances (100% compliance, no drug stock out, no interruption in services). The annual cost with the actual yearly compliance of 67% was estimated at US$49.12.

The national annual cost of RF management in Jamaica was estimated at US$78,249.88, the largest component of which was secondary prophylaxis. Despite having the lowest unit cost ($6.14 per visit), this made up 46.2% of the annual expenditure due to the high number of patients on register (see **Table 3).** This also translates to $US 56.09 per RF client per year.

Table 3: Summary of Average Cost of Inpatient and Outpatient Services for Rheumatic fever (ARF and RRF), RHD and Carditis, Jamaica, 2012-2018

Unit (Visit) Type	Diagnosis	Units per year	Cost/ Unit	Total cost per year	Source of Visit data
Admission **	ARF	29.57	605.28	17,899.02	NSU database
	RRF	4.92	605.28	2,979.84	National RF registry
	Carditis	1.08	617.64	665.15	
	RHD	6.22	695.3	4,324.59	
	Heart failure	0.92	605.28	558.72	
Non-Admission	ARF/RRF	1.88	74.91	140.46	Estimated from

Casualty Visit	Carditis	*	*	*	Admission to OPD visits ratio, Study data
	RHD	0.78	106.36	83.1	
	Heart failure	0	*	0	
Specialty OPD Visit	ARF/RRF	14.53	315.62	4,586.30	Estimated from Admission to OPD visits ratio, Study data
	Carditis	*	*	*	
	RHD	17.66	106.36	1,878.00	
	Heart failure	10.78	829.73	8,945.55	
Secondary Prophylaxis visits	ARF/ RRF/ RHD	5894	6.14	36,189.16	National RF registry
ANNUAL TOTAL				**78,249.88**	

Discussion

Our study's annual estimate of US$78,249.88 nationally, and US$56.09 individually for direct RF costs underscore the value of the prevention programme. The national cost of care of RF conditions has fallen significantly over the past 40 years, from a calculated $7,167.57 per admission in Millard's 1975-1985 estimation, to US$2,421.12 in 2018.[16] The evidence suggests a reduction in individual cost as well as the number of cases. There is limited information on the cost of the prevention and control programmes in other countries, but Brazil gives us an example with direct costs of US$271 per client per year in 2001,[20] and at 0.010% of per capita GDP, is considered an acceptable programme.[21]

The RF programme is locally underrecognized and absent from any prioritization plan in Jamaica.[22,23] Furthermore, from a global perspective, the RF programme is one of the least funded programmes relative to disease burden.[24] Costs adopted from the NHSF may also underestimate true costs. Costs for private or medical insured patients cited in the fee schedule are two to seven (average four) times more than the public-patient costs used for this study. Assuming private/insured costs more closely approximate true costs, the direct cost country expenditure can be estimated at US$312,999.52 per year (2018), i.e. US$2,421.12 per admission, which is comparable to the World Health Organization's CHOosing Interventions that are Cost-Effective (WHO-CHOICE) estimate for inpatients (at US$2,225.57, adjusted for inflation from 2010 reports).[25] These sources further approximate when considering that CHOICE excludes meal costs.

Even so, there are many opportunities for cost savings within programmatic, treatment and control arms of the local ARF/RHD response. For example, tests for which one result per admission is necessary to confirm diagnoses, vis-a-vis Anti Streptolysin-O (ASTO) and Erythrocyte Sedimentation Rate (ESR), were repeated as many as 11 and five times respectively in many admissions simply because the results were not provided in a timely manner from previous samples within the same admission.

In terms of programme priorities, Jamaica's low RF incidence and RHD prevalence calls for pursuit of endgame strategies to minimize resurgence,[10,26] identify missed RF cases (at risk of recurrent RF or RHD) and decrease mortality in RHD. This includes implementation of compliance boosting activities, and implementing CDRs and rapid antigen detection tests for point of care diagnosis in keeping with WHA recommendations.[17] Echocardiographic screening for occult RHD requires further research, since the literature acknowledges data gaps in low-risk populations, implementation challenges and significance of subclinical disease.[27] Increased perinatal care for RHD in pregnancy should also be considered. Between 1998 and 2003, 5.2% of maternal deaths were deemed cardiac, while between 1998 and 2015, an estimated 56% of non-obstetric maternal deaths were due to RHD.[28,29] However, limited local data concerning RHD pre and perinatal complications stymie the insight needed to make a recommendation or plan targeted interventions. For future consideration, this research can be expanded to include an analysis of RHD in

pregnancy outcomes, and cost minimization analysis to compare benefits of expanding local capacity versus standardization agreements with overseas centres for valvular surgeries and postoperative care.[30]

Other WHA recommendations are either already part of the RF control plan (e.g. abolition of user fees and cost-free antibiotics) or require more data for validation (e.g. overcrowding).[19,9] For comparison, jurisdictions like Australia have outlined end game strategies targeting social determinants of health, primary health care strengthening and secondary prophylaxis improvements,[31] while the USA discontinued the health education, surveillance and registry components of its programme while maintaining low RF rates. The last outbreak was over 40 years ago, confined to specific states and social groups.[32] Cuba discontinued its intensified programme in 1997,[15] and New Zealand retains only general surveillance and secondary care management, having discontinued main strategies (public education, household crowding reduction and priority community access to strep throat treatment) as a formal RF Prevention Programme (RFPP) in June 2017.[33] These examples show that gains can be protected after partial or complete programme discontinuation, assuming social and health aspects driving cases are thoroughly addressed.

Looking more closely at mortality in active RHD, some economic experts may argue advantages of primary over secondary prevention, with high variability across the literature.[30,34,35] This study reveals that though the local per patient cost of pharyngitis is only US$4.78, the estimated number of cases 0-15 years old island wide could yield a primary prevention cost US$159,377.11 annually, exceeding the total cost of secondary prophylaxis of US$36,189.16. This even exceeds a secondary prevention cost at 100% coverage and compliance, i.e., US$102,194.16 per year. The figures suggest that even if Strep throat was not treated, routine antibiotic prophylaxis of those who do develop RHD would be comparatively cost saving. This analysis, however, does not account for the increased number of RHD cases evolving from untreated Strep throat and ARF. In any event, costs contribute only partly to policy decisions, and we would not recommend discontinuation of primary prophylaxis.

Limitations

This study was threatened by high variability and overlap in the RF events (ARF, RHD, carditis and heart failure), where two or more were differentials in the same admission, with no definitive diagnosis even at discharge. for the purposes of this research, patients were placed in a costing designation based on the management approach, with exclusion of cases where overlap precluded designation.

There was also variability and overlap in the outpatient visits. An example includes patients scheduled for ward reviews vs OPD visits, complicated by same day referral to the casualty department, with or without admission to a ward. Investigations or partial treatment in the review or clinic would negate casualty testing or initial management. Thus, for this study, all outpatient activities were grouped as such and differentiated only by date.

Though surgical interventions and ICU admissions were included in the analysis, events were limited, affecting generalizability. Maximising the sample size by including all available cases aimed to address this limitation. Similarly, there was not enough information to quantify simultaneous management elsewhere. Patients are known to visit multiple health facilities for the same condition, specifically applicable to outpatient care. Though we inquired into concomitant management at secondary care facilities, this was frequently absent or not quantified in health records. The effect is likely self-limiting as patients continue prophylaxis visits during secondary OPD care and culturally disclose previous medication to minimize double scripting.

Finally, the Jamaican dollar inflation rate fluctuated significantly between 6.87% and 3.74% respectively between 2012 and 2018, hence before calculations, all costs were converted to the US dollar which demonstrated greater stability, with an annual end of year inflation rates of 1.7% to 1.9% for 2012 to 2018.[36]

Conclusion

The Jamaican RF Prevention and Control Programme has successfully and significantly reduced the burden and direct cost of RF complications since inception. CDRs with POC tests for Strep throat diagnosis, improved ARF testing turnaround time, and improving patient compliance with secondary prophylaxis are recommended areas for imminent reprioritization. Further research into pre and perinatal RHD complications, RHD screening and operative and post-operative care options is warranted to justify and plan investments into these programme components.

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