



# Mobility=Health

**THE IMPACT OF BICYCLE MOBILITY ON HEALTH CAREGIVERS AND THEIR CLIENTS IN ZAMBIA**

*Conducted and reported by World Bicycle Relief, World Vision, with certain data compiled by the Center for Global Health and Development at Boston University*

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**“What distinguishes World Bicycle Relief from any other bicycle program is that they are comprehensive and in-depth with their programming and product, and always emphasize quality over quantity. And even with high quality, they’ve managed to meet our required quantity to improve the effectiveness of our programming.”**

**— Bruce Wilkinson, former Chief  
of Party of RAPIDS, World Vision**

*Dorothy takes care of 20 patients monthly in the community of Mwinilunga. She meets some clients in the hospital's outdoor waiting room.*



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## ABBREVIATIONS

CIHD: Center for International Health and Development at  
Boston University

HBC: Home-Based Care

OVC: Orphans and Vulnerable Children

RAPIDS: Reaching HIV/AIDS Affected People with Integrated  
Development and Support

WBR: World Bicycle Relief

YHH: Youth-Headed Household

**Belly Hakalima is a caregiver  
serving 36 orphans and  
vulnerable children. With his first  
bicycle, Belly delivers maize to the  
grinding mill to provide meals.**



## STATEMENT OF GRATITUDE

World Bicycle Relief wishes to express gratitude to our program partners, World Vision Zambia and the RAPIDS consortium led by World Vision International in partnership with Africare, Catholic Relief Services (CRS), Expanded Church Response (ECR), Salvation Army, World Vision Zambia, and the Population Council. We also express gratitude to the Government of the Republic of Zambia and the people and communities we serve. Kirk Dearden, Candace Miller, and Kathryn Reichert headed field data collection by The Center for International Health and Development at Boston University. Audrey Sacks, Kerry MacQuarrie, Kate Wisniewski, and Jasmine Hutchinson provided valuable insight as our advisors. Leah Missbach Day provided the photography. Allison Augustyn wrote and consulted for this report.

**A long-time caregiver and first-time bicycle owner smiles during her first ride. She plans to visit her clients on the way home.**



## **EXECUTIVE SUMMARY**

The AIDS crisis has had a devastating effect on the people of Zambia: formal systems of healthcare, education and transportation are deteriorating, and informal systems of family and community networks are burdened to the breaking point. One way of addressing the pandemic has been to support existing networks of care, including home-based volunteer health workers. One such program, called RAPIDS (Reaching HIV/AIDS Affected People with Integrated Development and Support), has mobilized thousands of volunteer home based caregivers. World Bicycle Relief bicycles are a key part of this mobilization.

World Bicycle Relief (WBR) was founded in 2005 by leaders in the bicycle industry to provide comprehensive bicycle programs for disaster recovery and poverty relief in developing countries. RAPIDS, funded by USAID and led by World Vision International in partnership with other Non-Governmental Organizations (NGOs), requested World Bicycle Relief's participation, and the partnership began in 2006. The purpose of partnership with World Bicycle Relief was to improve caregiver mobility, thereby enabling volunteer healthcare workers to better serve their clients. Over a two-year period, World Bicycle Relief delivered 23,000 bicycles to 130 distribution sites across Zambia's nine provinces and trained over 470 bicycle mechanics.

World Bicycle Relief contracted the Center for International Health and Development (CIHD) at Boston University<sup>1</sup> to conduct qualitative and quantitative evaluation of the impact of WBR bicycles on the RAPIDS program. Drawing definitive conclusions from the CIHD study is challenging: small sample sizes, inconsistencies in indicator outcomes and lack of controls for seasonality proved to be confounding factors. However, overall results showed that caregivers used the bicycles to improve their mobility and access to clients. Qualitative and quantitative data indicated the following results:

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<sup>1</sup> CIHD was renamed the Center for Global Health and Development in 2010

- The bicycle was used effectively and consistently:
  - o 67% of caregivers reported using a WBR bicycle to reach their clients.
  - o 77% of clients reported that a caregiver used a WBR bicycle to transport them to a clinic for necessary healthcare.
- Caregiver retention was high:
  - o Generally, typical volunteer health worker programs in Africa report approximately 50% annual retention rate of volunteers.<sup>2</sup>

**“When I got the bicycle from RAPIDS, I found myself spending extra time with clients and getting to know them better — this is because I was making frequent visits.”**

— Female caregiver, Kalomo

- o RAPIDS, with the contribution of World Bicycle Relief bicycles, enjoyed a 97% annual caregiver retention rate.<sup>3</sup>
- Access to care services and caregiver visits increased.
- Caregiver quality and satisfaction improved.
- Bicycles augmented caregivers’ status and income potential.
- For Youth Headed Households, school attendance and access to healthcare improved.

<sup>2</sup> According to Bruce Wilkinson, Chief of Party, RAPIDS

<sup>3</sup> Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings July 2009, Revised 2010, p 17

The following quotes from an independent evaluation of the RAPIDS program conducted by Population Council corroborate the positive findings:

Among households receiving a visit from caregivers during the preceding six months, there was a 66 percent increase between baseline and endline among those who reported that the caregiver arrived by bicycle, correlating that bicycles played a significant role in caregivers overcoming transportation barriers to service delivery. Furthermore, during focus group interviews, caregivers testified that the use of bicycles had resulted in improved quality and duration of their caregiving visits.<sup>4</sup>

Intervention components that have helped to maintain and even improve service quality have included the distribution of bicycles to caregivers.<sup>5</sup>

Overall, the World Bicycle Relief bicycles were a valuable addition to the RAPIDS program and a useful tool for caregivers. Bicycles should be considered an aid to implementing volunteer health worker programs.

## **INTRODUCTION & BACKGROUND**

The AIDS crisis has had a devastating effect on the people of Zambia. USAID estimates that 801,000 Zambian children have been orphaned, and 16.5% of adult Zambians live with the disease; the World Health Organization estimates average life expectancy at just 40 years. Consequently, formal systems of healthcare, education and transportation are deteriorating, and informal systems of family and community networks are burdened to the breaking point.

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4 Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings, Revised 2010, p 16

5 Ibid, p 32

One way of addressing the pandemic has been to support existing networks of care, including home-based volunteer health workers. In Zambia, the RAPIDS program has reached over 600,000 orphans and vulnerable children by mobilizing thousands of volunteer home based caregivers. World Bicycle Relief bicycles are a key part of this mobilization.

**Bicycles improve a volunteer's ability to reach those in need as well as carry significantly more supplies.**

World Bicycle Relief (WBR) was founded by leaders in the bicycle industry as a response to the devastation caused by the Indian Ocean Tsunami of December 2004. WBR was established with



the mission to provide access to independence and livelihood by supplying quality bicycle programs to people in disaster relief situations and developing countries. Through partnership with SRAM Corporation, TREK Bicycles, World Vision and many corporate, foundation and individual donors, WBR delivered 24,400 high quality, locally sourced bicycles to carefully selected men, women, and children in post-tsunami Sri Lanka.

Due to the effectiveness of the program in Sri Lanka, in 2006 World Vision asked World Bicycle Relief to partner with them to address an even more devastating disaster: the AIDS crises in Southern Africa. World Vision was already leading a program called RAPIDS in Zambia where nearly 1 million children have been orphaned by the disease.<sup>6</sup> RAPIDS, a consortium of six Non-Governmental Organizations (NGOs),<sup>7</sup> was a five-year program funded through a \$57 million grant from USAID under the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). The RAPIDS program aimed to provide over 200,000 volunteer community-based healthcare workers with materials and training so they could in turn provide basic healthcare and access to clinics for people living with HIV/AIDS and support for Orphans and Vulnerable Children (OVCs) and Youth-Headed Households (YHHs).<sup>8</sup>

Bruce Wilkinson, chief of party of the RAPIDS program, identified the need for bicycles early on but was unable to find a reliable bicycle that would work for the caregivers. World Bicycle Relief was brought on to identify and source quality bicycles to be integrated into the program, primarily to increase productivity

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6 According to USAID

7 Lead NGO: World Vision International; Partner NGOs: Africare, Catholic Relief Services (CRS), Expanded Church Response (ECR), Salvation Army, World Vision Zambia, Population Council

8 It is important to distinguish between OVCs and Youth-Headed Households. The vast majority of OVC households are headed by a surviving parent, aunts, uncles, grandparents or other adults. OVCs are vulnerable because of parental death but generally have an adult present in the home. The standard definition of an OVC is a child less than 18 years of age. In contrast, Youth-Headed Households have no adult present to provide basic necessities and monetary support. Typically, the youth household head will have increased school absenteeism due to the need to provide for other children in the household. There is no standard age limit for youth-headed households; however, frequently, households with individuals 24 years of age or less are considered to be youth-headed.

and retention of trained volunteer caregivers and, to a lesser degree, to assist youth-headed households. The expectation was that bicycles would help caregivers reach clients and increase clients' access to health services. Bicycles would increase caregivers' ability to participate in economic activities and encourage them to work in a timely and consistent manner. Moreover, having a bicycle would reduce caregiver attrition rates and increase their community status.

To determine where the bicycles would be sourced, extensive product and market research was conducted in Zambia by F.K. Day, the President of World Bicycle Relief. His 20 years of experience in product development at SRAM Corporation allowed him to quickly determine that locally available imported bicycles were of poor quality; they deteriorated as soon as two weeks after purchase due to the challenging rural terrain and the heavy loads carried by users. The suppliers of these inferior bicycles had reduced their component costs and quality to the point of becoming disconnected from the end-users' need for reliable transportation. WBR assembled a team of technical experts from SRAM Corporation, the second largest bicycle component manufacturer in the world, to develop a robust bicycle with affordable components designed to withstand years of service under extreme conditions. The end product is a low-cost bicycle that can carry over 200lbs of cargo and last a generation if properly maintained.

To support program sustainability, World Bicycle Relief developed a field mechanic training program including business and technical skills. Prior to bicycle delivery, the RAPIDS partners identified field mechanics from the communities where the bicycles were to be delivered and sent them for a week's training on entrepreneurship, marketing, basic accounting and proper repair and maintenance techniques. The field mechanics were supplied with a business skills curriculum and workbook, a bicycle which they assembled, a proper set of tools, a technical manual with only diagrams and no words to overcome language barriers, a set of overalls, and a certificate of completion. These trained field mechanics entered into a two-year service-to-own

contract, were supervised by the local RAPIDS partners, and assisted at the bicycle delivery ceremonies. In all, WBR trained over 470 field mechanics to support the RAPIDS program and created a national supply chain of spare parts through continued communication with the trained mechanics.

Through the lessons learned with the RAPIDS program, World Bicycle Relief's model has evolved to provide comprehensive, scalable, sustainable bicycle solutions by:

- Partnering with relief organizations to provide integrated quality bicycle programs to meet their desired goals in healthcare, education, economic development and disaster relief
- Continually assessing bicycle performance in the field and working with component suppliers to improve quality and technology

**Stella heard about RAPIDS in her isolated village and asked a trained volunteer caregiver for help. She was placed on the back of a bicycle and transported 15 kilometers to the nearest road, where she was then taken by local van to a mission hospital. She tested positive for HIV/AIDS and was given nutritional supplementation and caregiver support.**



- Documenting the impact of bicycles in humanitarian relief situations, communicating results, improving programs and increasing awareness

Because of the experience gained with the healthcare focused initiative in Zambia, World Bicycle Relief decided to expand its reach by developing programs focused on economic development and education. In 2007, WBR initiated a microfinance pilot program to provide working capital and loans for bicycles to selected small and vulnerable entrepreneurs,

**“All of us spend less time on the road and more time with our clients. This has meant that we pay more attention to the needs of the people we look after.”**

— Male caregiver, 31 years old,

**3 years of service**

households and communities in Zambia thereby strengthening their capacity to respond to the economic, social and health impact of HIV/AIDS. In 2009, WBR launched the Bicycles for Educational Empowerment Program (BEEP), distributing bicycles to improve rural Zambian children’s access to education.

As of this report, World Bicycle Relief has provided over 55,000 bicycles worldwide to caregivers, entrepreneurs, schoolchildren and teachers, most of whom live in rural areas. WBR has reached people in all nine provinces throughout Zambia, has expanded into Zimbabwe and Kenya, and is developing plans for Mozambique, Malawi, and Uganda.

In 2008, World Bicycle Relief commissioned an evaluation from The Center for International Health and Development at Boston University (CIHD) to measure the impact of the bicycles within the context of the RAPIDS program and to review the results with the goal of improving future programming and communicating the efficacy of bicycles. An independent evaluation of the RAPIDS program, commissioned by the RAPIDS consortium, was conducted by the Population Council from 2005-2009.

**CIHD EVALUATION: “EXTERNAL EVALUATION OF THE IMPACT OF BICYCLES ON CAREGIVERS AND THEIR CLIENTS IN A COMMUNITY INTERVENTION TRIAL IN RURAL ZAMBIA”**

**OBJECTIVE**

The CIHD evaluation aimed to measure the impact of World Bicycle Relief bicycles used by two populations in the RAPIDS program:

1. Volunteer caregivers providing home-based support to three types of clients in rural communities; the client population can be segmented into three groups:
  - a. Home-Based Care clients living with HIV/AIDS (HBCs)
  - b. Orphans and Vulnerable Children (OVCs)
  - c. Youth-Headed Households (YHHs)
2. Youth-Headed Households

Specifically, the goal of the evaluation was to determine if providing a bicycle improved outcomes in the following four areas:

1. caregiver mobility and access to clients
2. caregiver retention in the program
3. client care and services
4. YHH’s school attendance, access to markets and earning power

## **METHODS**

### **Study Design**

CIHD implemented a community-based, pre/post, intervention/control design study in two districts, Mpika and Mbala, both located in the Northern Province of Zambia. Program outcomes were measured before intervention began (before bicycles were provided) and again eight months after bicycles were provided. Changes in outcomes over the study period in Mpika, the intervention site, were compared with changes in Mbala, a comparable site where the intervention had not yet begun. Baseline data was collected in July and August 2008 from both districts; all endline data was collected in April 2009. To complement the quantitative study, CIHD conducted focus group discussions in both Mpika and Mbala at endline to provide qualitative data.

### **Study Sites & Target Populations**

In Mpika, the intervention site, bicycles were delivered to caregivers and Youth-Headed Households just after baseline data collection (August 2008). In Mbala, the control site, no bicycles were distributed prior to or during the evaluation period; caregivers and YHHs received bicycles after endline data collection (April 2009). The sites were chosen due to similar socio-demographic rural characteristics, and World Vision was the RAPIDS implementing partner at both sites.

Four distinct populations were surveyed for the study:

- 1) Caregivers
- 2) Home Based Care clients (HBCs)
- 3) Orphans and Vulnerable Children (OVCs)
- 4) Youth-Headed Households (YHHs)

The local World Vision offices in Mpika and Mbala selected study participants from a simple random sample of respondents.

CIHD intended to enroll 890 individuals as survey subjects to determine differences between intervention and control groups using one main indicator per group. At baseline, 531 individuals

were enrolled, just 59% of the intended sample size. The data pool dropped again at endline to 406 individuals, 45% of the intended sample size. The drop in individuals from 531 at baseline to 406 at endline marks a statistically significant 24% decrease in sample size; a decrease of 5-10% can invalidate statistical results. The decrease in sample size from baseline to endline was attributed to the challenges of rosters, distances, relocation, death, status change, and absence.

**Hilda, a young caregiver, sees her training as a way to “protect myself and others. I feel I am helping some that are really in need.” Hilda uses her bicycle to reach her clients.**



## Sample Sizes

	Mpika			Mbala		
	Goal	Baseline	Endline	Goal	Baseline	Endline
Caregivers	110	86	77	110	77	70
HBCs	115	58	45	115	59	44
OVC Households	110	96	78	110	71	31
Youth Headed Households	110	40	30	110	44	31
Total	445	280	230	45	251	176

## Outcome Indicators by Population

Based on consultation with WBR and RAPIDS, CIHD identified key indicators to measure for each population:

- Caregivers: duration of visits
- HBCs and OVCs: quality of services offered by the caregivers
- YHHs: school absenteeism

**Katendi is a Volunteer Caregiver whose primary effort is focused on testing people for HIV at the Mwinilunga District Hospital in Zambia.**



CIHD developed five indicators to measure bicycles' impact on caregivers:

1. the frequency and duration of caregiver visits to clients' homes
2. geographic outreach of caregiver services
3. quality of services caregivers provide
4. retention of caregivers in the RAPIDS program
5. effect on a caregiver's household, including financial well-being, school attendance and family health

CIHD developed four indicators to measure bicycles' impact on YHHs:

1. school attendance
2. access to markets
3. earning power
4. effect on the family in general

Caregiver impact was assessed by survey and interviews of caregivers, HBCs, OVCs and YHHs; YHH impact was assessed by YHH surveys and interviews.

### **Data Collection**

CIHD developed four structured surveys in English, each tailored to address specific characteristics of each population and the desired indicators. The surveys were translated into Bemba, the language spoken in the northern region of Zambia. To maximize comparability of data, surveys at baseline and endline were almost exactly the same except for the addition of questions at endline specific to the use of WBR bicycles. CIHD trained a team of Zambian research assistants (RAs) over the course of one week prior to data collection at baseline and endline in order for RAs to become familiar with and pilot the surveys, discuss translations and practice interviewing. Under the supervision of CIHD, RAs administered the Bemba surveys to members of the four study populations at both baseline and endline and at both intervention and control sites.

## **Data Analysis**

Data clerks entered the information using Census and Survey Processing System (CSPRO 3.3) software developed by the U.S. Census Bureau. Quantitative household surveys were transferred from the database into Statistical Analysis Software (SAS 9.1) for data cleaning and analysis. CIHD then created a data analysis plan to use all remaining relevant data, systematically calculating frequencies for variables as well as 'crosstabs' (data analysis that requires two variables). CIHD faculty and staff then calculated appropriate statistics. With endline data, CIHD computed difference-in-differences estimates by calculating the mean differences between outcomes in the intervention and control groups at baseline and at endline. The difference between the two means is an estimate of program impact. The difference-in-differences methodology is commonly used in program evaluations because it accounts for both observable and unobservable between-group differences at baseline.

## **FINDINGS: QUANTITATIVE**

### **Notes on the data**

Statistical data accuracy is measured in terms of alpha p-values which correspond to the degree of probable reliability of the results. When the p-value is low, the difference detected is likely to be a true difference, not the result of sampling variation. In the following tables compiled from survey responses, data accuracy is indicated as falling into one of five categories. Categories and their corresponding p-values and percent accuracy levels are listed in the table below. Any data with an unacceptably high p-value is marked as NS (not significant); data not provided by CIHD is marked as N/A (not available).<sup>9</sup>

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<sup>9</sup> Please note that the following data is often not available or reflects discrepancies. Statistical p-values are often greater than ( $p > 0.10$ ), which indicates a high level of improbability in the final results. CIHD at Boston University provided the following reasons for statistically insignificant results:

1. Some sample sizes were not large enough to produce meaningful results. For example, at endline, CIHD consistently collapsed the "strongly agree" and "agree" response categories to find meaningful statistical results.
2. For some initial baseline analyses, CIHD combined client groups such as OVCs and YHHs to address

Category	P-Value	% Accuracy
*	≤0.10	90%
**	≤0.05	95%
***	≤0.01	99%
N/S	Not Significant	—
N/A	Not Available	—

## Caregivers

### (1) Frequency and duration of caregiver visits to clients' homes

	Mpika				Mbala				
	Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance	
<b>HBCs</b>									
Percentage of caregivers who visited within the last week	67.3	36.4	<.0001	NS	38.6	38.6	0.2152	NS	
Percentage of caregivers who visited 1–2 weeks ago	23.6	27.3	n/a	N/A	22.8	6.8	n/a	N/A	
Mean number of visits within the last month	3	2.9	0.9661	NS	2.9	4.9	0.2998	NS	
Average Time (in hours) caregivers spent with clients	3.8	1.8	0.0002	***	3.5	2.3	0.0773	*	
<b>OVCs</b>									
Percentage of caregivers who visited within the last week	53.1	32.5	0.0093	***	47	39.3	0.6919	NS	
Percentage of caregivers who visited 1–2 weeks ago	20.8	20.8	n/a	N/A	22.7	17.9	n/a	N/A	
Mean number of visits within the last month	4.2	2.5	0.0592	*	3.3	1.3	0.0056	***	
Average Time (in hours) caregivers spent with clients	4.9	2.5	0.005	***	3.6	2.5	0.0658	*	
<b>YHHs</b>									
Percentage of caregivers who visited within the last week	48.7	46.7	0.2299	NS	39	38.7	0.5237	NS	
Percentage of caregivers who visited 1–2 weeks ago	21.6	33.3	n/a	N/A	26.8	32.3	n/a	N/A	
Mean number of visits within the last month	4.3	4.9	0.6208	NS	2.6	2.7	0.85	NS	
Average Time (in hours) caregivers spent with clients	4.6	2.1	0.1891	NS	2	4.4	0.1348	NS	

Significance: \*≤.10, \*\*≤.05, \*\*\*≤.01, NS (not significant) or N/A (not available).

modest sample sizes. When CIHD analysed baseline data the second time, they did not combine the groups.

3. Changes in individuals' status— recovery, relocation, death— led to differences in numbers. Because of the very small sample sizes, a change in status in just one or two individuals makes a substantial difference in percentages. Each category changed by 1-3 respondents; this represents a potential change in percents from 1 - 4%.

(2) Geographic outreach of caregiver services

		Mpika				Mbala			
		Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance
<b>HBCs</b>									
	Number of HBC clients a caregiver worked with in previous month	2.2	1.3	0.0011	***	4.5	3.6	0.471	NS
	Percentage of HBCs whose caregivers helped them to clinic	29.1	15.6	0.517	NS	4.4	9.7	0.2409	NS
<b>OVCs</b>									
	Number of OVC clients a caregiver worked with in previous month	13.2	11	0.1176	NS	21.1	14.4	0.0308	**
	Percentage of OVCs whose caregivers helped them to clinic	9.7	10	0.3287	NS	20.8	0	0.0562	*
<b>YHHs</b>									
	Number of YHH clients a caregiver worked with in previous month	1.8	0.7	0.0095	***	2.3	1.4	0.2361	NS
	Percentage of YHHs whose caregivers helped them to clinic	n/a	n/a	n/a	N/A	n/a	n/a	n/a	N/A
		Mpika				Mbala			
		Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance
<b>Caregivers</b>									
	Percentage of caregivers who walked to reach clients	96	20	0.<.0001	NS	92	91.2	0.9893	NS
	Percentage of caregivers who used non-WBR bike to reach clients	4	10	n/a	N/A	7.4	7	n/a	N/A
	Percentage of caregivers who used WBR bike to reach clients	0	67	n/a	N/A	0	0	n/a	N/A
	Percentage of caregivers who used non-WBR bike to take HBCs to clinic	50	60	0.9624	NS	50	0	0.4	NS
	Percentage of caregivers who used WBR bike to take HBCs to clinic	0	76.9	0.<.0001	NS	0	0	n/a	N/A

Significance: \*≤.10, \*\*≤.05, \*\*\*≤.01, NS (not significant) or N/A (not available).

**(3) Quality of services caregivers provided: Percentage of satisfaction  
with services caregivers provided to HBCs and OVCs**

	Mpika				Mbala			
	Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance
<b>HBCs</b>								
Completed record	61.4	66.7	0.6235	NS	45.5	62.1	0.1644	NS
Checked health	100	97.4	0.4194	NS	84.8	87.9	0.754	NS
Suggested adequate health plan	69.6	72	0.8598	NS	57.6	66.7	0.9173	NS
Brought meds	38.9	31.6	0.4716	NS	35.6	34.4	0.9148	NS
Brought supplies	27.8	5.3	0.0062	***	28.3	21.9	0.5252	NS
Provided food supplements	25.9	35	0.3415	NS	26.1	6.1	0.0342	**
Checked food stores	40.4	22.5	0.0697	*	32.6	24.2	0.4195	NS
Info CG provides meets my needs	88.5	76.9	0.1421	NS	78.6	75	0.7175	NS
I get services I need from CG	35.9	46.2	0.3192	NS	48.8	59.4	0.3656	NS
CG provides vital assistance	82.7	71.8	0.2141	NS	76.2	62.5	0.2018	NS
<b>OVCs</b>								
Completed record	65.9	53.1	0.1189	NS	41.5	47.4	0.6581	NS
Checked health	19.8	0	<.0001	NS	14.1	51.6	0.0001	***
Suggested adequate health plan	4.2	0	0.0682	*	1.4	3.2	0.5426	NS
Brought meds	5.2	0	0.0408	**	1.4	9.7	0.0478	**
Brought supplies	5.2	0	0.0408	**	1.4	3.2	0.5426	NS
Provided food supplements	3.1	0	0.1153	NS	0	9.7	0.0078	***
Checked food stores	2.1	0	0.1998	NS	4.2	0	0.2454	NS
Info CG provides meets my needs	89	91.6	0.5911	NS	73.2	80	0.513	NS
I get services I need from CG	31.9	34.3	0.7462	NS	44.4	68	0.0513	*
CG provides vital assistance	81.8	78.9	0.6412	NS	80	76	0.6852	NS

Significance: \*≤.10, \*\*≤.05, \*\*\*≤.01, NS (not significant) or N/A (not available).

#### ***(4) Retention of caregivers in the RAPIDS program***

Retention of caregivers improved, and it should be noted that in a few cases, caregiver length of service exceeded the duration of the RAPIDS program. According to the RAPIDS Evaluation Final Report, “The RAPIDS program showed a 97% retention rate of its trained caregivers.”<sup>10</sup> A cited motivation for the RAPIDS caregiver retention was the prospect of receiving a bicycle on a two-year, service-to-own contract. The CIHD report shows the following length of service in months:

	<b>Mpika</b>				<b>Mbala</b>			
	Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance
Caregivers								
Average length of service in months (95% CI)	29.7	36.6	n/a	N/A	27.7	34.4	n/a	N/A
	23.9–35.6	25.5–47.9			23.2–32.3	30.1–38.7		

#### ***(5) Impact of bicycle on caregiver’s household, including financial well-being, school attendance and health of the family***

Caregiver household demographics remained essentially unchanged between baseline and endline in both Mpika and Mbala. Poverty and food security were serious issues for caregivers, as evidenced by the number of days they reported eating less than three meals per day and the number of days per month they went without adequate food.

### **Youth-Headed Households**

#### ***(1) School attendance***

	<b>Mpika</b>				<b>Mbala</b>			
	Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance
YHHs								
Percentage of children who attended school	53	50.6	0.722	NS	49.2	48.6	0.9217	NS
Children who walked to school	100	n/a	n/a	N/A	96.8	100	n/a	N/A
Average days missed per month	2.41	0.65	0.0045	***	4.2	4	0.7091	NS

<sup>10</sup> Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings July 2009, Revised 2010, p 17

Among YHHs, bicycle recipients in Mpika went to school more often. Children averaged 2-3 days of absences per month at baseline in both Mpika and Mbala. This number dropped substantially in Mpika at endline but remained unchanged in Mbala. School children in rural Zambia travel, on average, 2-10 kilometers each way to arrive at school; a bicycle shortens the time required for this commute.

**(2) Access to health care providers**

	Mpika				Mbala			
	Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance
YHHs								
Percentage who walked to care	49	23.5	0.0001	***	35.7	61.1	0.003	***
Percentage who used non-WBR bike	33.3	0	n/a	N/A	42.9	5.6	n/a	N/A
Percentage who used WBR bike	0	55.9	0.0001	***	0	5.6	0.003	***

**(3) Earning Power in Youth-Headed Households**

Available food is tied to seasonality – in the rainy season, when endline data was collected, available food stocks dropped significantly, as they do annually. This undoubtedly affected the endline results in terms of satisfaction, begging and work.

	Mpika				Mbala			
	Baseline	Endline	P-Value	Significance	Baseline	Endline	P-Value	Significance
YHHs								
Percentage dissatisfied with available food	74.4	93.3	0.0179	**	60.5	83.9	0.0674	*
Percentage who begged for food/money	31.6	53.3	0.0703	*	18.2	32.3	0.1599	NS
Percentage who sold goods or services to make money	8.7	4.4	0.2813	NS	9.7	10.2	0.9004	NS
Percentage who worked for wages	5.6	4.4	0.7636	NS	2.2	0.9	0.6306	NS

Significance: \*≤.10, \*\*≤.05, \*\*\*≤.01, NS (not significant) or N/A (not available).

**(4) Effect on the YHH family in general**

Boston University researchers developed this indicator for Youth-Headed Households but failed to provide data on their findings.

### **Additional Notes on Responses of Caregivers, HBCs, OVCs, and YHHs**

- The vast majority of caregivers said they were very satisfied with their caregiving responsibilities. In Mpika, where bicycles were distributed, overall satisfaction improved slightly between baseline and endline; there was no significant change in Mbala, where no bicycles were distributed during the study period.
- The number of HBCs with chronic illnesses decreased from baseline to endline in both Mpika and Mbala, and clients' functionality improved from baseline to endline. HBC clients in Mpika reported that caregivers were often available to help them reach health care at both baseline and endline; HBC clients in Mbala reported that caregivers were not often available to help them reach health care.
- OVCs' self-reported health improved from baseline to endline in Mpika, but not Mbala.
- At baseline, YHHs in Mpika and Mbala indicated wanting more time and services from caregivers, but satisfaction improved by endline, particularly in Mpika.
- OVC client households were generally healthier than clients living with HIV/AIDS. OVC health improved from baseline to endline in Mpika, but not in Mbala. Caregivers were able to provide transport much more often in Mpika than in Mbala, and these findings did not change between baseline and endline.

### **FINDINGS: QUALITATIVE**

The Center for International Health and Development research team carried out focus groups to complement the quantitative data. At the time of endline data collection, CIHD conducted two focus groups: the first with caregivers in the control group in Mbala and the second with caregivers in the intervention group in Mpika. Each focus group involved 11 respondents, split almost evenly between males and females with varying levels of experience as caregivers.

Caregivers in Mbala appeared eager to demonstrate their need for WBR bicycles, readily citing the challenges they faced as

they carried out volunteer activities. Many of the challenges revolved around transport to clients' homes, as well as transport to carry clients to clinics and other services. Respondents mentioned more than once that they often failed to carry out their volunteer work without a WBR bicycle.

In Mpika, caregivers indicated multiple ways the WBR bicycles helped them carry out volunteer services and improved their personal lives (e.g. taking family members to clinics).

In both districts, bicycle owners (non-WBR bicycle owners in Mbala, and WBR bicycle owners in Mpika) indicated that owning a bicycle made them rich and well respected in their communities. Caregivers in Mbala expressed a strong interest in obtaining WBR bikes, while caregivers in Mpika indicated satisfaction with the many tasks WBR bicycles helped them to carry out with their clients.

#### **Caregiver Challenges Reported — Mbala (Control Group)**

When asked about challenges caregivers face in their personal and/or professional lives as caregivers, respondents mentioned transportation first:

“What I feel is the biggest problem we face as caregivers is lack of transport. For instance, I look after a lot of OVCs households, about 20, but managing to visit them is a very big challenge for me.”— Male caregiver, 66 years old, 5 years of service

“What my colleague said at the beginning about lack of transport is very true. For instance, I look after a lot of HBCs as well, but they are so far apart. To tell you the truth, I do not manage to visit all of them.”— Male caregiver, 37 years old, 5 years of service

“What pains me most is that if I have a problem with my client, and he/she needs to be taken to a health facility, people in the villages who have bikes make me pay for the

use of their bike.”— Male caregiver, 37 years old, 5 years of service

“We hope that one day someone will help us with bikes. We know for sure that our colleagues in Mpika got bikes, and things there have really improved. What about us? We need bikes for us to serve our clients better.”— Male caregiver, 66 years old, 5 years of service

Caregivers indicated that OVCs and HBCs in their care experience a variety of problems including lack of shelter and inability to pay school fees:

**When not testing or counseling patients, Katendi makes rounds bringing hope to patients in the hospital.**

World Vision pays only half while the other half is supposed to come from the OVCs themselves. Where can they get this money?— Male caregiver, 48 years old, 5 years of service



Also, according to the caregivers, community members' perceptions of caregivers were not necessarily favorable:

"The problem with the community we live in is that they think we pocket money and other things meant for them that comes from World Vision." — Male caregiver, 44 years old, 5 years of service

Other challenges caregivers in Mbala expressed included the following:

"no food to carry for our clients during visitations"  
— female caregiver, 55 years old, 5 years of service

"no materials to give our clients such that some of them want to chase us because we always go empty-handed"  
— male caregiver, 49 years old, 5 years of service

#### **Caregiver Challenges Reported - Mpika (Intervention Group)**

When asked about challenges caregivers face in their personal lives, respondents mentioned food shortages (especially when they needed to provide food for their family and OVCs living in their homes), lack of employment, malaria (especially among children), inability to send children to school every day because schools are far away and inability to transport agricultural products to market:

"Before I got the bike from WBR, I never used to sell any of my agricultural products because I could not manage to transport any to town and my local villagers could not afford to buy." — Male caregiver, 58 years old, 6 years of service

When asked about challenges they face in their professional lives as caregivers, many related difficulties providing services to clients. Some of these challenges were common only in the past when caregivers didn't have bicycles:

“The biggest problem we had was that of movement but I think we can all agree that that is now a thing of the past.”  
— Male caregiver, 52 years old, 3 years of service

Caregivers report a current inability to provide for the various needs of clients:

“Some of our clients are really sick and they have no medication. They rely on us but we cannot help them ... because we do not carry medicines in most cases.”  
— Female caregiver, 50 years old, 1 year of service

“I have a lot of [Orphans and Vulnerable Children] and most of them cry when I visit them because they expect something from me.”— Male caregiver, 41 years old, 3 years of service

“[Clients] usually ask for things like blankets, clothes and medicines but we do not have these things for us to give them.”— Female caregiver, 48 years old, 4 years of service

Caregivers in Mpika also mentioned difficulty getting around in the rainy season and working at night (too dark, no lights on the bicycles) as current challenges.

### **Caregivers’ Perspectives On The Benefits Of Bicycles — Mpika (Intervention Group)**

Caregivers repeatedly mentioned how bicycles helped them as they carried out their volunteer work:

“We never used to visit our clients regularly because we thought that was too much for us to do. Like you have seen, distances here are huge and walking on an empty stomach was too much.”— Female caregiver, 53 years old, 6 years of service

“Before we had the WBR bicycles, we had a lot of problems. For instance, we could not manage to ferry our clients to

health facilities due to transportation costs. With the bikes that we received, this task has now been made possible.”— Female caregiver, 31 years old, 6 years of service

“Before I received the bike from WBR, I used to spend a lot of time walking and less time with my clients.”— Male caregiver, 41 years old, 3 years of service

“In the past, whenever one of our clients fell ill, we used to hire bikes in order to seek health services. It was very expensive because we used to pay as much as K40,000

**Frank (front) was taken by caregiver Nebo (back) on the handlebars of Nebo’s bicycle to get tested for HIV. When Frank tested positive, Nebo visited regularly. Here, Frank is putting on weight due to Nebo’s care and medication monitoring.**



[app. \$9 USD] per client in order for us to reach the health facility.”— Male caregiver, 27 years old, 1 year of service

“[Before we had WBR bikes], we did not have money to hire bikes all the time and put our customers on buses. We resorted to carrying them on our backs until we reached health facilities.”— Male caregiver, 27 years old, 1 year of service

“Some of our clients, like HBCs, are really sick. We move around on bikes to inform their relatives about how they’re doing.”— Male caregiver, 34 years old, 6 years of service

“All of us spend less time on the road and more time with our clients. This has meant that we pay more attention to the needs of the people we look after.”— Male caregiver, 31 years old, 3 years of service

“Once we took our clients and sometimes even our own relatives to the hospital and they were admitted. We never used to visit them because transport was very expensive.”  
— Male caregiver, 34 years old, 6 years of service

One caregiver mentioned that having a bicycle would extend his years of service as well as quantity of services provided:

“For me, I think this bike will make me stay on and provide more services to my clients.”— Male caregiver, 40 years old, 1 year of service

“These bikes...attract more people to join us as caregivers because people have seen the benefits to belonging to World Vision.”— Female caregiver, 48 years old, 4 years of service

Caregivers also mentioned how bicycles improved their own lives:

“I would like to thank WBR for the bikes that they gave us. These bikes are really helping us, such that me personally, my personal problems have been reduced.”— Male caregiver, 58 years old, 6 years of service

“We are already using bikes to ferry our produce to the markets. Already that means more income for us.”  
— Female caregiver, 31 years old, 6 years of service

“Life is easy and cheap when you have a bike.”  
— Female caregiver, 48 years old, 4 years of service

“Sometimes people borrow my bike; they pay me when they borrow it. That gives me an income.”— Male caregiver, 34 years old, 6 years of service

#### **ADDITIONAL FOLLOW-UP TEAM STUDY**

In November 2009, a Monitoring and Evaluation (M&E) field team was assembled to re-visit Mpika, the intervention site, to provide greater context for the results provided by the CIHD data. The team was composed of three trained M&E Officers (one representative each from World Vision Zambia, Africare, and the RAPIDS Project Management Unit), as well as the Project Technical Assistant, the Program Manager for Logistics, and the Head of Zambian Operations from World Bicycle Relief.

#### **Objective**

The follow up visit was conducted with four objectives in mind:

1. To further understand the quality of the project execution among the study population as part of a post-evaluation investigation
2. To further investigate the relationship between the community and the caregivers
3. To make general observations concerning the changes as a result of the introduction of bicycles to the community
4. To investigate possible confounding variables that could explain the disparate results of the CIHD data

## **Methods**

The study populations were beneficiaries of the RAPIDS program under World Vision. Prior to the visit, individuals were randomly selected to participate in scheduled focus group discussions. The field team developed focus group protocols and semi-structured interview guides for three different groups: Caregivers, YHHs, and OVCs. A total of four key informant interviews and seven focus group discussions were conducted. The regions selected were easily accessible but sufficiently spaced from each other to avoid participants influencing each others' responses. All data was recorded on manuscripts and audio recorders and later transcribed for analysis. Nvivo, a qualitative software package, was used for the analysis.

## **Findings**

This study visit found that the bicycle program was well implemented and administered in Mpika, where commute distances are vast. The program faced challenges from external pressures such as poverty and distance, compromising the quality of program implementation. The RAPIDS program incorporates Gifts in Kind (GIK) as part of its development efforts for the vulnerable and needy; however, one distribution rarely includes enough GIK to reach all members of the community, and this creates tension, conflict and misunderstanding among community members. In spite of these challenges, the level of service provided was used and appreciated by clients and the general community. The introduction of bicycles clearly made a difference where distance is a challenge, and a bicycle is considered an asset, especially for the work of a caregiver.

## **RAPIDS EVALUATION:**

### **RAPIDS Evaluation Final Report 2005–2009 Key Findings Revised 2010, Population Council**

The RAPIDS partners contracted Population Council to conduct an independent evaluation of their program. Excerpts of the final report discuss the positive results of the program's partnership with World Bicycle Relief.

Caregiver visits increased significantly: at endline, 69% of households reported that caregivers had brought change.<sup>11</sup>

During the study period, the coverage of OVC caregiver visits among eligible households between baseline and endline showed significant expansion, increasing from 7 to 17 percent overall. However, population coverage is low overall, with high and increasing levels of vulnerability and unmet demand in the community.<sup>12</sup>

Surveys measured the coverage of caregiver visits, including contact during the prior six months and during the prior week. The coverage of HBC caregiver visits showed a slight (but not statistically significant) increase from 12 to 15 percent of eligible households between baseline and endline.<sup>13</sup>

It is important to note that this change took place during a period of rapidly expanding access to antiretroviral treatment, which changed the dynamics of household eligibility and demand for RAPIDS services for many reasons, including improvements in clients' health and mobility. During the same period, among households who reported receiving caregiver visits to support OVC or chronically ill individuals over the prior six months, the mean number of reported visits during the preceding six months

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11 Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings July 2009, Revised 2010, p 7

12 Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings July 2009, Revised 2010, p 7

13 Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings July 2009, Revised 2010, p 16

increased significantly from 2.3 visits at baseline to 10.9 visits at endline. Among those who had a caregiver visit, the households reporting having a caregiver visit during the past week increased significantly from 12 percent at baseline to 34 percent at endline ( $p < 0.01$ ). Sixty-nine percent of respondents reported that the caregivers had brought changes to the household, a significant improvement from 53 percent at baseline ( $p < 0.01$ ).<sup>14</sup>

In late 2006, RAPIDS, in conjunction with World Bicycle Relief, began providing bicycles to the 18,000+ caregivers who work with the Consortium, in order to help them to reach clients spread across a wide geographical area. Among households receiving a visit from caregivers during the preceding six months, there was a 66 percent increase between baseline and endline among those who reported that the caregiver arrived by bicycle, confirming that

**A caregiver with a bicycle can provide better and more frequent health care to more people at a lower cost.**



bicycles played a significant role in caregivers overcoming transportation barriers to service delivery. Furthermore, during focus group interviews, caregivers testified that the use of bicycles had resulted in improved quality and duration of their caregiving visits.<sup>15</sup>

“When I got the bicycle from RAPIDS, I found myself spending extra time with clients and getting to know them better—this is because I was making frequent visits.”

— Female caregiver, Kalomo<sup>16</sup>

## LIMITATIONS OF THE DATA

Much of the quantitative data lacks the statistical significance necessary to draw definitive conclusions. Evaluating the overall effect of bicycles on outcome indicators like frequency of caregiver visits and number of clients visited is complicated. A number of exogenous factors impact health-related outcomes: rainfall levels, nutrition, personal security, sickness, the roughness of the terrain, the cost of goods and supplies, and the local political cultural context; however, the survey controlled for only a few of these variables. Furthermore, the sample size of the survey was so small that the effect of bicycles on the RAPIDS program might be swamped by these exogenous factors.

- From a relatively small baseline sample size, the number of clients and caregivers interviewed at the beginning of the study dropped between baseline and endline by 24%: people had moved to new locations, could not be located, or had died.
- Also, there is a highly likely seasonal impact, as the baseline was conducted during the dry winter season in Zambia, while endline was conducted near the end of the rainy season, which is accompanied by extreme challenges of mobility due to flooding and impassable roads.
- The time between baseline and endline reports was just

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15 Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings July 2009, Revised 2010, p 16

16 Population Council, RAPIDS Evaluation Final Report 2005–2009 Key Findings July 2009, Revised 2010, p 16

eight months, most likely not adequate time in which to conduct a baseline study, implement the bicycle program, and then see measurable results.

- As discovered in the focus group discussions and the follow-up field visit, jealousies and perceptions of disparity in resource allocation could bias the client respondents' answers when asked about caregiver services. In the rural Zambian context, a bicycle is a valuable asset indicating wealth. Caregivers' receipt of a new bicycle may have exacerbated clients' perception of inequitable benefits. Improved community sensitization on GIK distribution methodologies (gifts-in-kind – i.e. how are donated shoes and clothing, toys and games allocated to the field) with greater transparency regarding recipient selection may help to mitigate such jealousies.

Although the quantitative data indicate disparate results, the ongoing positive feedback from bicycle beneficiaries and clients in the RAPIDS program and the overwhelming positive qualitative response from the study's focus group discussions reflect the positive impact of the program.

## **COMMENTARY FROM BRUCE WILKINSON**

### **FORMER CHIEF OF PARTY FOR RAPIDS, SPEAKING ON THE EFFICACY OF WBR WITHIN THE RAPIDS PROGRAM:**

“Caregiver retention has improved. The bicycle has become a status symbol in the community. It says, ‘I am a caregiver, I am a resource to my community.’ This is highly motivational, which helps retention rates. When a person is given a bike and follows a work-to-own program, they make a commitment. With RAPIDS, there is a formal transfer of the bike to an individual. Individuals sign a contract in front of their community leaders, and the formalized transfer almost mandates that the bicycle should be used for the community. The individual realizes that he or she is now also a community asset. The bike is then used independently of RAPIDS program, such as carrying supplies to individuals, or helping community members get to hospitals and clinics. It’s an asset that becomes a communal asset, but still also empowers the individual.”

“RAPIDS was such an effective program that we received an additional \$27 million in aid, which was unusual. The United States and Zambian governments were enthused about the program because we were leveraging other resources, like bicycles with World Bicycle Relief. Additionally, we’ve brought in gift-in-kind donations from corporations, who are giving those resources because the bicycle is this incredibly effective tool that goes the last mile in the supply chain delivery process. People were so enthused with the supply chain and the accountability in the supply chain that it made a huge difference to their willingness to contribute, in that they contributed even more than we expected.”

“World Vision would like to work with bikes again, and World Bicycle Relief certainly will be the source. With World Bicycle Relief, we get the whole package: assembly, design, delivery, mechanics and effective supply chain with our spare parts, medicines and gifts-in-kind.”

**Women riders lead the pack of caregivers after World Bicycle Relief's first distribution of bicycles in Zambia in June 2007.**



## **CONCLUSION**

Taking all qualitative and quantitative data into account, we can state with confidence that the World Bicycle Relief bicycles were a valuable addition to the RAPIDS program. Bicycles assisted caregivers in the RAPIDS program by:

- Improving access to care services and increasing caregiver visits
- Improving volunteer caregiver retention rates
- Improving caregivers' satisfaction, income potential and community status

Furthermore, bicycles improved school attendance and access to healthcare in Youth-Headed Households. Based on these studies, bicycles should be considered an aid to implementing volunteer health caregiver programs.



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