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ESTIMATING THE COST OF HIV/AIDS AND TB SERVICES AT HEALTH FACILITIES IN CAMBODIA

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Objectives

- ▶▶ To understand the unit costs of delivering HIV/AIDS and TB service
- ▶▶ To identify the major components of costs and sources of funding

Why it is so important to cost these diseases?

- ▶▶ Implementation of the National Social Protection Policy Framework 2016-2025
- ▶▶ Sustainability of the insurance schemes
- ▶▶ Reasonable payment by health insurance to health facilities



Services included in cost analyses

▶▶ HIV/AIDS

- ❖ Voluntary and Confidential Counseling and Testing (VCCT/ provider initiated testing and counseling (PICT))
- ❖ Antiretroviral treatment (ART)
- ❖ Prevention of mother to child transmission of HIV (PMTCT) (only costs for visits and treatment of infants exposed to HIV)
- ❖ Inpatient (IP) care for the treatment of OIs

▶▶ TB

- ❖ TB outpatient (OP) treatment (diagnosis and treatment)
 - ▶ Excludes community-based activities
- ❖ IP care for people diagnosed with TB



Approach

- ▶▶ Provider perspective – patient costs for transportation, etc. not collected
- ▶▶ Mixed top-down and bottom-up approaches
 - ❖ Top-down for facility overhead / indirect costs
 - ❖ Bottom-up for TB/HIV specific staffing, TB/HIV specific items
 - ❖ Sampled up to 20 inpatient records for HIV and 20 inpatient records for TB at facilities with inpatient services



Types of costs included

- ▶▶ Direct medical / staff costs for disease treatment
- ▶▶ Capital items include furniture, equipment, computers, buildings, etc..
- ▶▶ Facility indirect and overhead (“step-down”) costs (such as administration, utilities, maintenance, cleaning, etc.)
- ▶▶ Programmatic overhead costs, which include supervision, training, etc. that are directly tractable to the facility level.
- ▶▶ Overhead laboratory costs / costs for laboratory services performed outside of the health facility.

Sample

Province	Number of Provincial Hospitals	Number of Referral Hospitals	Number of Government Health Centers	Number of clinics
Phnom Penh	0	2	4	1
Kampong Cham	0	2	4	0
Siem Reap	1	1	4	0
Battambang	1	1	0	0

Type of facility	VCCT	ART (1 st 2 nd line)	Pediatric ART	IP care for OIs	TB outpatient care	IP care for TB
Provincial Hospital	2	2	1	2	2	2
Referral Hospital	5	6	1 + 4 PMTCT only	5	5	5
Health Center	12	0	0	0	12	0
Clinic	1	1	1	0	0	0



RESULTS



VCCT Total Costs

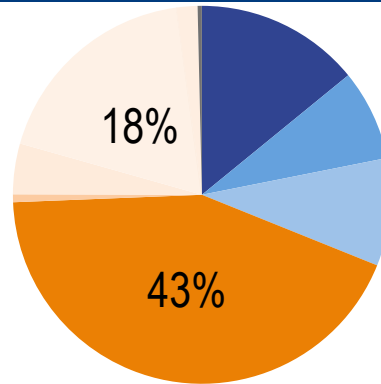
Cost category	Health Center	%	Clinic	%	Referral Hospital	%	Provincial Hospital	%
Number of facilities	12		1		5		2	
Subtotal: Step-down / indirect costs	\$1,527	31%	\$16,541	36%	\$4,245	46%	\$7,442	37%
Salary & Benefits (clinical staff)	\$2,126	43%	\$8,916	20%	\$3,278	36%	\$8,511	43%
Equipment and furniture	\$33	1%	\$2,722	6%	\$51	1%	\$296	1%
Medical Supplies	\$213	4%	\$3,342	7%	\$512	6%	\$498	3%
Rapid Tests	\$907	18%	\$3,115	7%	\$931	10%	\$2,947	15%
Partner notification	\$0	0%	\$0	0%	\$2	0%	\$0	0%
Other direct activities	\$0	0%	\$9,086	20%	\$0	0%	\$0	0%
Training, mentoring, and supervision	\$88	2%	\$1,829	4%	\$103	1%	\$35	0%
Vehicles	\$18	0%	\$70	0%	\$30	0%	\$164	1%
Subtotal: Direct costs	\$3,385	69%	\$29,080	64%	\$4,907	54%	\$12,451	63%
Total	\$4,912		\$45,622		\$9,152		\$19,893	
Range:	\$760 to \$13,600				\$3,800 to \$13,800		\$19,000 to \$20,500	

VCCT Unit costs

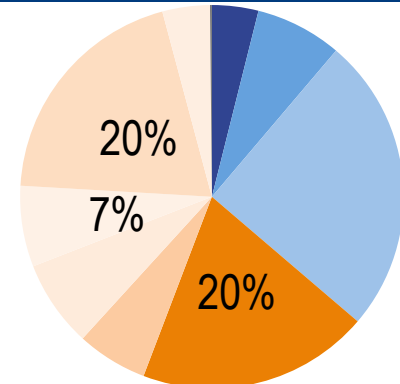
	Cost per visit			
	HC	Clinic	Referral Hospital	Provincial Hospital
Total	\$9.36	\$13.89	\$13.99	\$8.79
Range	\$2.10 to \$18.89		\$5.75 to \$28.87	\$5.89 to \$11.69

VCCT cost breakdown

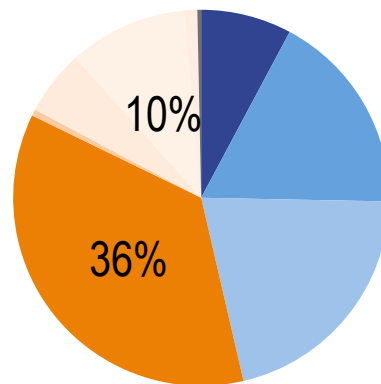
- Indirect Costs
- Administrative overhead
- Intermediate services overhead
- Salary & Benefits (clinical staff)
- Equipment and furniture
- Medical Supplies
- Laboratory (Rapid Tests)
- Partner notification
- Other direct activities
- Training, mentoring, and supervision
- Vehicles



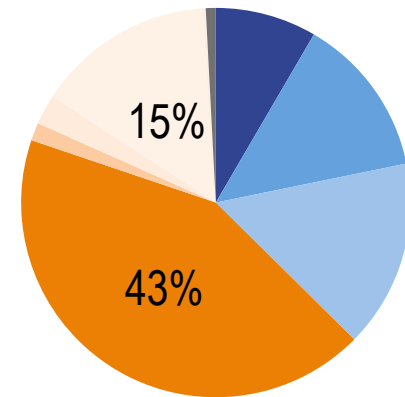
Health Center



NGO Clinic

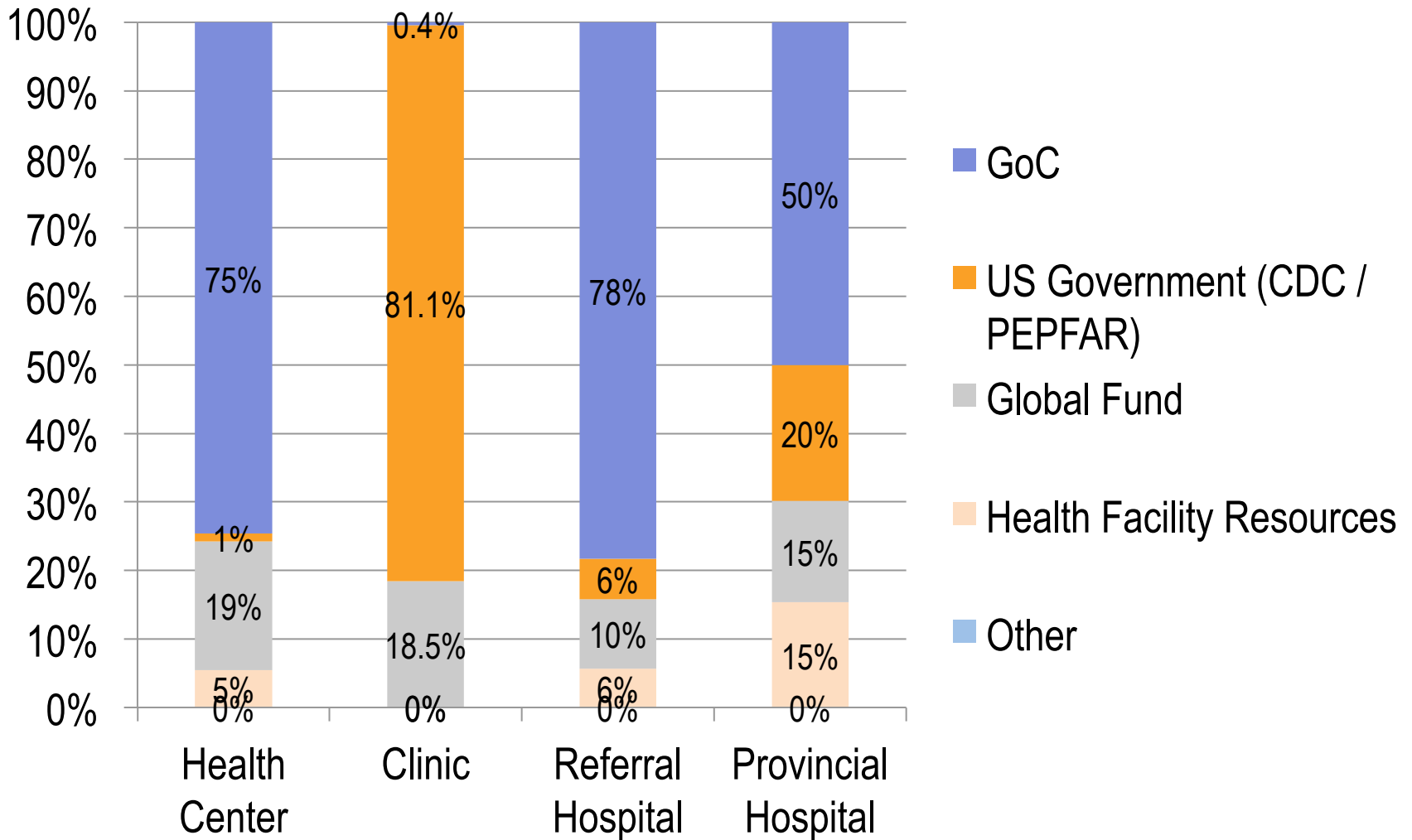


Referral Hospital



Provincial Hospital

VCCT sources of finance



ART Total Costs (per facility per year)

Cost category	Clinic	%	Referral Hospital	%	Provincial Hospital	%
Number of facilities	1		6		2	
Subtotal: S-D / indirect	\$39,664	14%	\$21,819	21%	\$110,328	15%
Salary & Benefits (clinical staff)	\$38,062	13%	\$15,613	15%	\$80,149	11%
Equipment and furniture	\$4,671	2%	\$346	0%	\$709	0%
ARVs 1st line	\$95,908	34%	\$43,081	42%	\$259,706	35%
ARVs 2nd line	\$29,116	10%	\$5,005	5%	\$99,963	13%
ARVs Pediatric	\$1,920	1%	\$346	0%	\$25,089	3%
Other Drugs	\$34,694	12%	\$7,778	7%	\$55,543	7%
Medical Supplies	\$5,386	2%	\$907	1%	\$3,198	0%
CD4	\$6,410	2%	\$2,143	2%	\$48,464	7%
Viral Load	\$10,931	4%	\$4,077	4%	\$41,916	6%
Other Lab	\$751	0%	\$1,507	1%	\$16,121	2%
Sample transport	\$548	0%	\$285	0%	\$144	0%
Subtotal: Direct clinical	\$228,397	81%	\$81,088	78%	\$616,845	85%
Subtotal: Other Direct	\$15,316	5%	\$866	1%	\$2,128	0%
Total	\$283,377		\$103,774		\$729,301	
Range:			\$80,000 to \$179,000		\$555,000 to \$904,000	

Breakdown of ART first line costs

Average per facility		Clinic (n = 1)		Referral Hospital (n = 6)		Provincial Hospital (n = 2)	
		Amount	%	Amount	%	Amount	%
Building and utilities		\$22	7%	\$25	9%	\$13	6%
Administrative overhead		\$21	6%	\$17	7%	\$9	4%
Intermediate services overhead		\$4	1%	\$13	5%	\$10	5%
Other operational overhead		\$0	0%	\$2	1%	\$2	1%
Subtotal: Overhead costs		\$47	14%	\$57	22%	\$34	16%
Salary & Benefits (clinical staff)		\$45	14%	\$45	17%	\$25	12%
Equipment and furniture		\$5	2%	\$1	0%	\$0	0%
Pharmaceutical	ARV 1st line	\$139	43%	\$117	44%	\$101	47%
	ARV 2nd line	\$0	0%	\$0	0%	\$0	0%
	Pediatric	\$0	0%	\$0	0%	\$0	0%
	Other Drugs	\$41	13%	\$18	7%	\$18	8%
Medical Supplies		\$6	2%	\$2	1%	\$1	0%
Laboratory	CD4	\$8	2%	\$5	2%	\$16	8%
	Viral Load	\$13	4%	\$10	4%	\$13	6%
	Other	\$1	0%	\$7	3%	\$5	2%
Sample transport		\$0	0%	\$1	0%	\$0	0%
Subtotal: Direct clinical costs		\$259	80%	\$205	78%	\$179	84%
Subtotal: Other direct costs		\$18	6%	\$2	1%	\$1	0%
Total		\$323		\$264		\$214	

Breakdown of ART second line costs

Average per facility		Clinic (n = 1)		Referral Hospital (n = 5)		Provincial Hospital (n = 2)	
		Amount	%	Amount	%	Amount	%
Building and utilities		\$22	4%	\$32	5%	\$22	3%
Administrative overhead		\$21	4%	\$22	4%	\$14	2%
Intermediate services overhead		\$4	1%	\$17	3%	\$17	2%
Other operational overhead		\$0	0%	\$2	0%	\$3	0%
Subtotal: Overhead costs		\$47	9%	\$74	12%	\$55	7%
Salary & Benefits (clinical staff)		\$45	9%	\$58	9%	\$39	5%
Equipment and furniture		\$6	1%	\$1	0%	\$0	0%
Pharmaceutical	ARV 1st line	\$0	0%	\$0	0%	\$0	0%
	ARV 2nd line	\$314	63%	\$432	70%	\$605	78%
	Pediatric	\$0	0%	\$0	0%	\$0	0%
	Other Drugs	\$42	8%	\$25	4%	\$23	3%
Medical Supplies		\$6	1%	\$3	0%	\$1	0%
Laboratory	CD4	\$8	2%	\$7	1%	\$23	3%
	Viral Load	\$13	3%	\$14	2%	\$18	2%
	Other	\$0	0%	\$2	0%	\$7	1%
Sample transport		\$0	0%	\$1	0%	\$0	0%
Subtotal: Direct clinical costs		\$435	87%	\$543	88%	\$716	93%
Subtotal: Other direct costs		\$18	4%	\$3	0%	\$1	0%
Total		\$501		\$619		\$772	

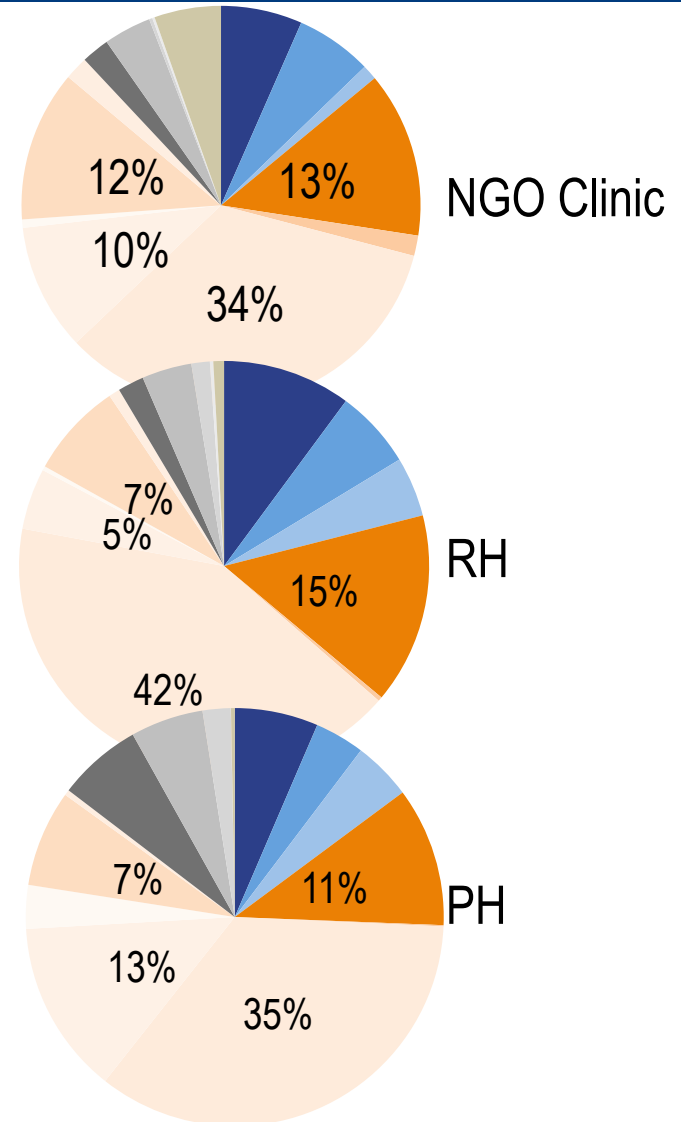
ART Unit costs

Unit	Clinic	Referral Hospital	Provincial Hospital
Cost per visit			
First-line ART	\$52	\$50	\$45
Second-line ART	\$79	\$99*	\$100
Pediatric ART	\$50	\$163**	\$28
ART (all)	\$54	\$51	\$48
Cost per patient per year			
First-line ART	\$323	\$264	\$214
Second-line ART	\$501	\$619*	\$716
Pediatric ART	\$298	\$143**	\$320
ART (all)	\$256	\$268	\$236
PMTCT			
Number of facilities	0	4	1
Cost per visit for treatment of HIV exposed infants	N/A	\$20	\$6

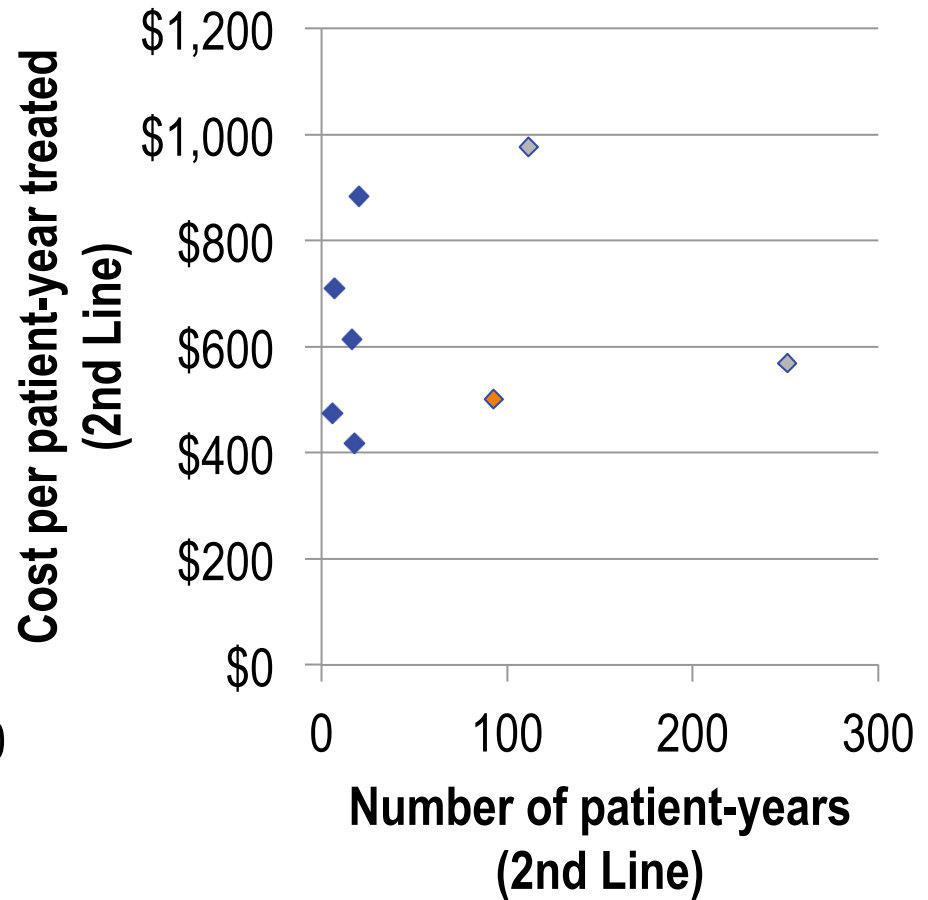
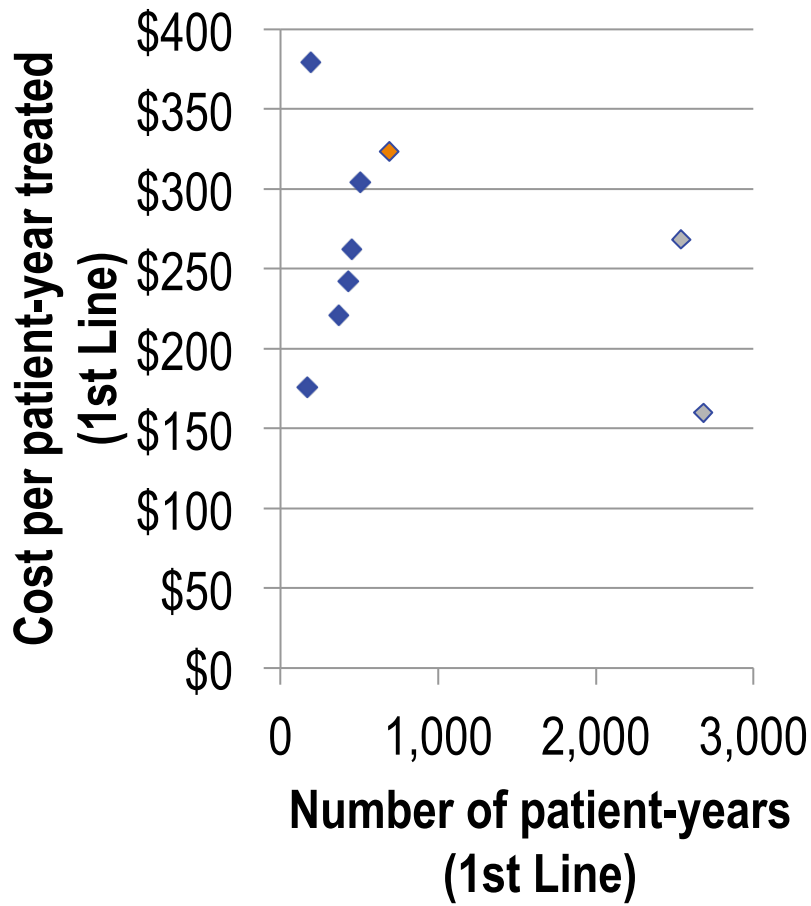
*5 facilities; **1 facility

ART Cost Breakdown

- Indirect Costs
- Administrative overhead
- Intermediate services overhead
- Salary & Benefits
- Equipment and furniture
- ARV 1st line
- ARV 2nd line
- Pediatric
- Other Drugs
- Medical Supplies
- CD4
- Viral Load
- Other laboratory tests
- Sample transport (Lab)
- Other direct costs

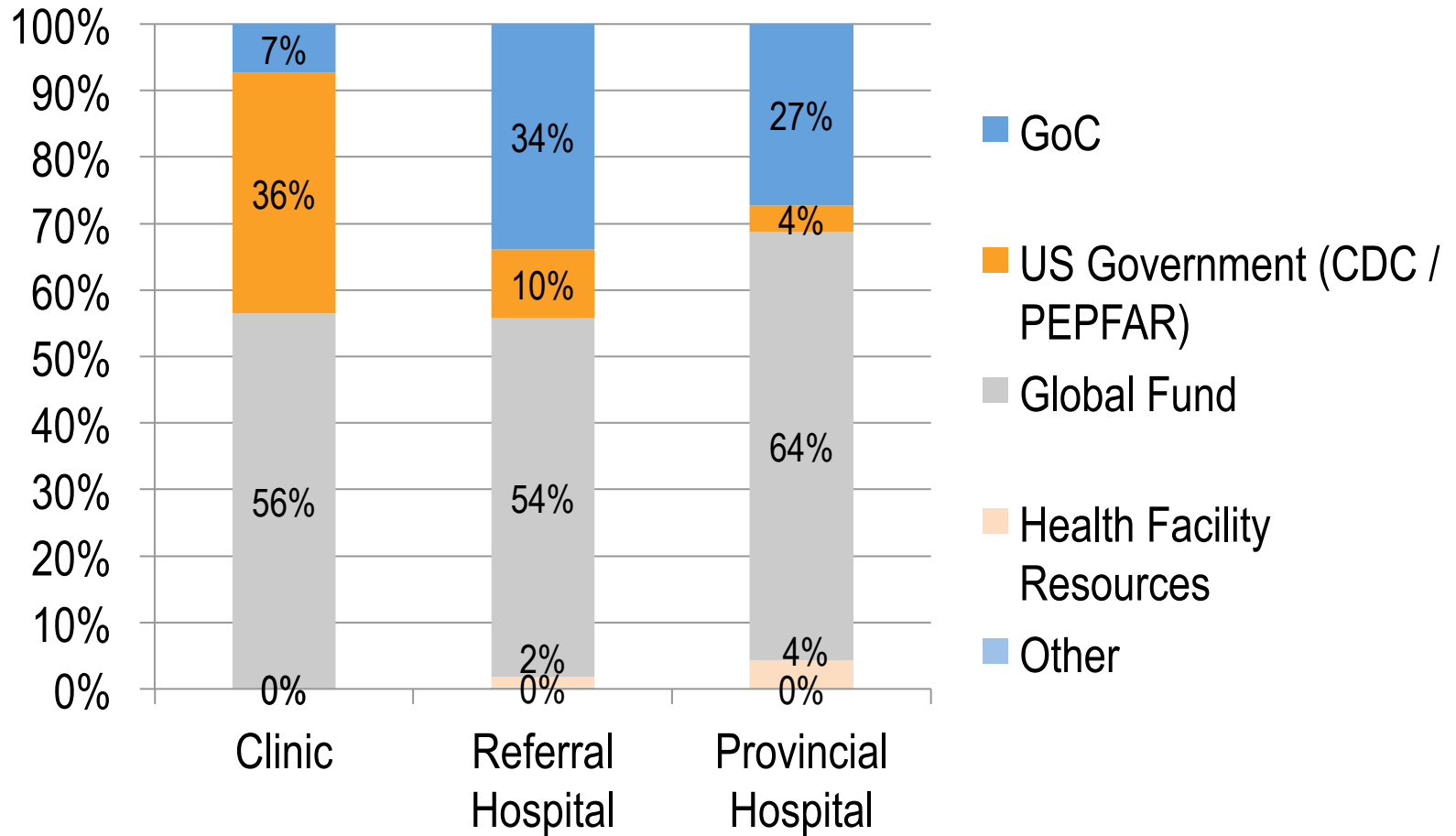


Cost per patient year vs. number treated



Each dot is one facility; blue = referral hospital, red = clinic, gray = provincial hospital

ART sources of finance



TB outpatient costs

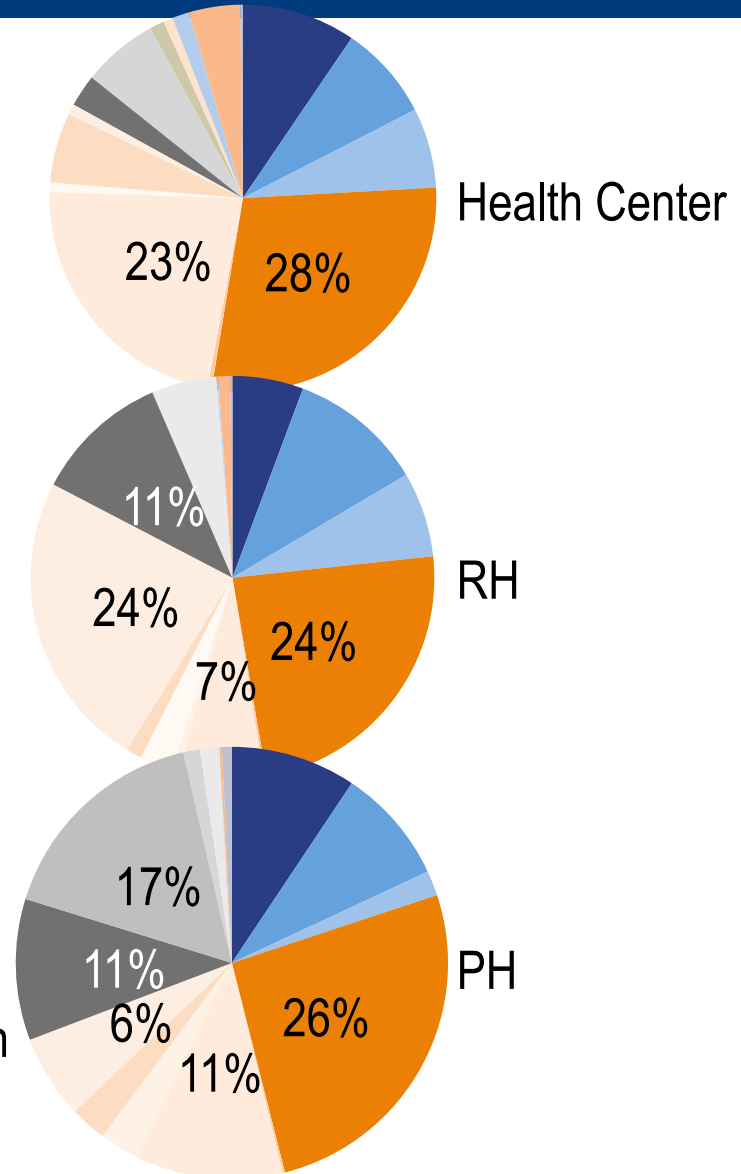
Cost category	Health Center	%	Referral Hospital	%	Provincial Hospital	%
Number of facilities	12		5		2	
Subtotal: S-D / indirect	\$782	24%	\$4,191	23%	\$23,027	20%
Salary & Benefits (clinical staff)	\$922	28%	\$4,319	24%	\$30,206	26%
Equipment and furniture	\$12	0%	\$38	0%	\$195	0%
TB 1st line drugs	\$730	23%	\$1,218	7%	\$12,795	11%
TB non 1 st line drugs	\$0	0%	\$104	1%	\$3,396	3%
TB Pediatric drugs	\$26	1%	\$474	3%	\$9	0%
Medical Supplies	\$190	6%	\$223	1%	\$3,150	3%
Sputum smear	\$28	1%	\$4,298	24%	\$7,238	6%
Gene Xpert	\$87	3%	\$1,957	11%	\$12,223	11%
Other Lab	\$0	0%	\$0	0%	\$19,192	17%
Sample transport	\$205	6%	\$0	0%	\$1,440	1%
Imaging	\$0	0%	\$937	5%	\$1,679	1%
Subtotal: Direct clinical	\$2,200	68%	\$13,568	75%	\$91,523	79%
Subtotal: Other Direct	\$258	8%	\$228	1%	\$1,056	1%
Total	\$3,240		\$17,987		\$115,606	
Range:	\$800 to \$8,100		\$12,000 to \$21,800		\$80,000 to \$150,000	

TB OP Care Unit Costs

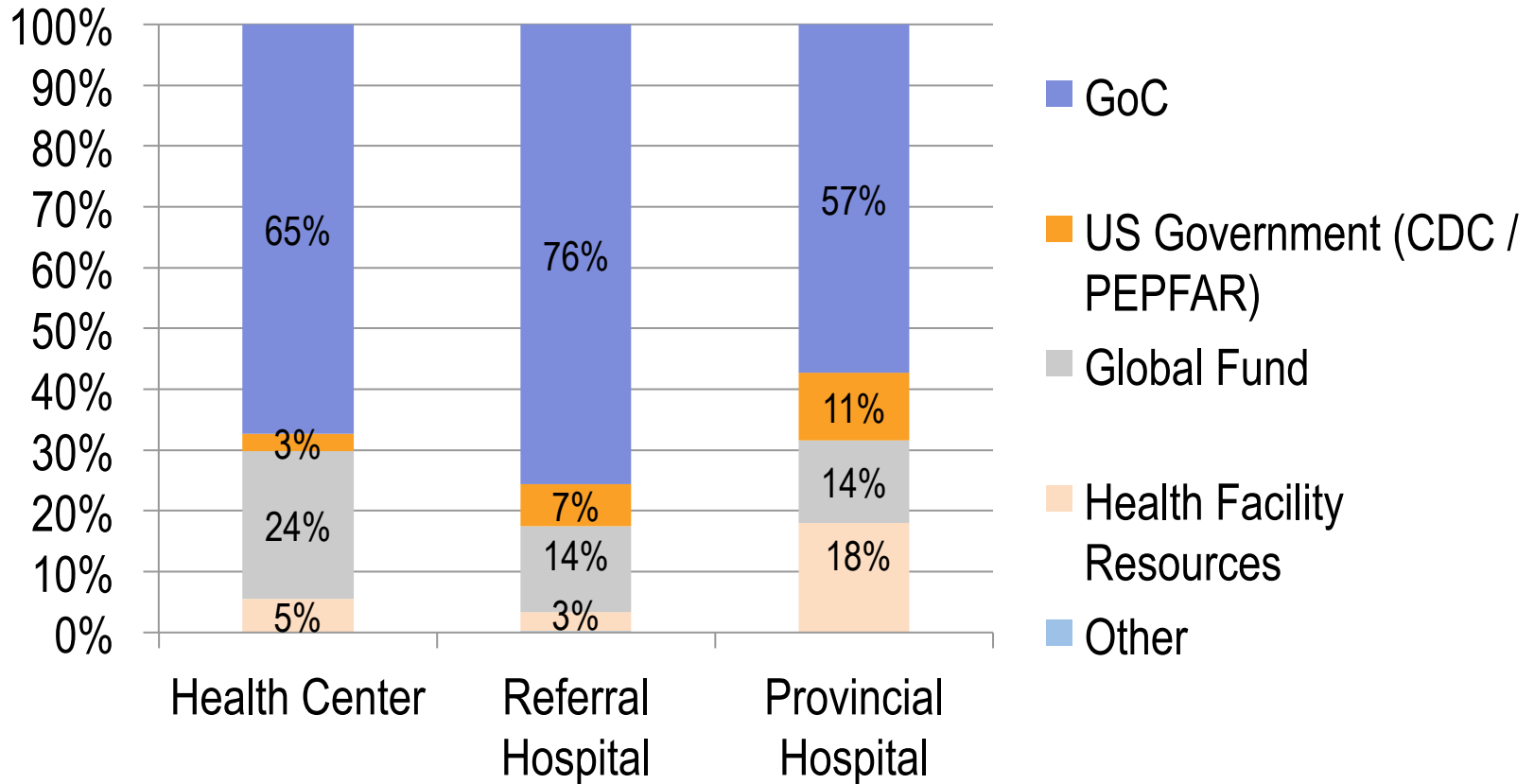
Unit	Health Center	Referral Hospital	Provincial Hospital
Number of facilities	12	5	2
Cost of TB Diagnosis	\$32	\$44	\$36
TB SS+ per patient*	\$39	\$70	\$126
TB other per patient	\$57	\$142	\$203
Pediatric TB per patient	\$46	\$36	\$78
TB SS+ per patient successfully treated*	\$42	\$97	\$179
TB Other per patient successfully treated	\$74.67	\$187	\$302
Pediatric TB per patient successfully treated	\$100.64	N/A	\$195

TB outpatient cost breakdown

- Indirect Costs
- Administrative overhead
- Intermediate services overhead
- Salary & Benefits (clinical staff)
- Equipment and furniture
- Drugs: Sputum Positive
- Drugs: TB Other
- Drugs: Pediatric
- Medical Supplies
- Sputum Smear
- Gene Xpert
- Other lab
- Sample transport
- Imaging
- Contact tracing
- Loss-to-follow up tracing
- Other direct activities
- Training, mentoring, and supervision
- Vehicles



Results: TB OP sources of finance



Results: IP Costs

	Admissions per 1,000 patients / patient-years		Average Length of Stay		Cost per admission		Cost per Patient / per Patient per year	
	RH	PH	RH	PH	RH	PH	RH	PH
Inpatient care for OIs	37.6	43.1	30.1	8.4	\$266	\$93	\$6.38	\$7.97
Inpatient care for TB	407.7	616.6	109.5	23.4	\$517	\$187	\$136	\$116



Discussion

- 1. HIV/AIDS and TB services in Cambodia are dependent on donor funding**
 - ❖ ART is the most donor dependent, with upwards of 2/3rds of all costs financed by the US Government or The Global Fund
- 2. There is a substantial range in the unit cost of providing services across facility types and among individual facilities**
 - ❖ The cost PPY for 1st-line ART ranges from 2/3rds the average cost to 1.45 times greater than the average
 - ❖ For the cost per sputum smear positive patient successfully treated, costs at individual facilities can range from 1/3rd of the average cost to over 2.6 times the average cost

Discussion (2)

3. **Cost for ART is driven by drug costs, while staff salary and benefits is the largest cost category for most other services**
 - ❖ ARVs 45% to 52% of all ART costs, about 45% of 1st line patient costs, and 63% to 78% of 2nd line patient costs
 - ❖ Staff costs about 1/3rd of VCCT costs and 1/4th of TB OP costs
4. **Facility step-down and indirect costs represent a substantial proportion of the overall costs**
 - ❖ VCCT: 31% to 46% of total costs
 - ❖ Outpatient TB care: 20% to 24% of total costs
 - ❖ ART: 14% to 21% of total costs
5. **IP care for TB is a large component of TB costs**
 - ❖ IP care represented about 44% of *all* TB cost at referral hospitals
 - ❖ 39% of all costs at provincial hospitals
 - ❖ Driven by long lengths of stay (over 3.5 months, on average), coupled with about 40% of TB patients being admitted to the ward.



Thank you