Strengthening Commune Health Centers in Vietnam: Assessing the Impact of The Atlantic Philanthropies 2008-16

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This report is an overview of the main findings from a large-scale longitudinal study of rural health care in Vietnam from 2008 to 2016. Funded by The Atlantic Philanthropies (AP), a limited life foundation, the study was jointly conducted by the Social Science Research Council (SSRC) and the Vietnamese Academy of Social Sciences (VASS), and at arm's length from AP.

The research project operated under the leadership of Dr. Mary B. McDonnell of SSRC, along with Professor Đặng Nguyên Anh as head of the project coordination unit at VASS. The research was jointly designed by SSRC international advisors (Professors Anil Deolalikar, Judith Tanur, Hy V. Luong, and David Featherman, Dr. Mary McDonnell, Ms. Van Tran, and Ms. Nina R. McCoy); VASS team leaders (Professsor Đặng Nguyên Anh, Professor Nguyễn Hữu Minh, Associate Professor Vũ Mạnh Lợi, and Associate Professor Lê Thanh Sang); and Dr. Lê Minh Giang of Hanoi Medical University. Data collection was carried out by the case study team from the Southern Institute of Social Sciences (SISS, with Associate Professor Lê Thanh Sang, Ms. Nguyễn Thị Nhung, Ms. Nguyễn Đặng Minh Thảo, Mr. Trần Khánh Hưng, and Mr. Nguyễn Ngọc Toại), as well as by many other researchers from SISS, the Institute of Sociology, and the Institute for Gender and Family Studies, among other units.

This overview report relies significantly on Professor Judith Tanur's findings on self-reported health, and on the main findings of four VASS teams whose analyses were conducted with advice from Professors Anil Deolalikar, Judith Tanur, and Hy V. Luong, Dr. Mary B. McDonnell, and Ms. Van Tran. The four VASS teams were led by Professors Đặng Nguyên Anh and Nguyễn Hữu Minh, Associate Professors Vũ Mạnh Lợi and Lê Thanh Sang, with major contributions from Ms. Đào Thị Khánh Hòa (Vietnamese Ministry of Health), Associate Professor Nguyễn Đức Vinh, Ms. Nguyễn Thị Nhung, Dr. Nghiêm Thị Thủy, Dr. Trần Thị Hồng, and Mr. Trần Qúy Long. This overview report has also benefited considerably from additional data analyses conducted *pro bono* and on short notices by Ms. Nguyễn Thị Nhung and Professor Vũ Mạnh Lợi at my request in September and October 2018, as well as from detailed comments and suggestions by Judith Tanur, Mary B. McDonnell, and Van Tran. Ms. Alethea Cook of SSRC formatted several figures for this report.

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A commune health center before and after being rebuilt with funds from The Atlantic Philanthropies

EXECUTIVE SUMMARY

Commune health centers (CHCs) form the grassroots public health care system in rural Vietnam, where two-thirds of the Vietnamese population currently resides. CHCs provide basic-level preventive care as well as initial diagnoses, treatments and referrals to higher-level public hospitals.

Many CHCs have received considerable investments in infrastructure, high-technology equipment, and staff expertise, and through specific programs in reproductive health and maternal and child health. Many of these investments came from The Atlantic Philanthropies (AP), a limited life foundation, which was the leading international non-governmental organization in the health sector in Vietnam from 1999 to 2013.

This report assesses the impact of those investments in rural CHCs by AP, the Vietnamese government, and other international donors. It is based on a longitudinal study from 2008 to 2016 in twelve communes in three Vietnamese provinces: Thái Nguyên in the north, Khánh Hòa in the central coast, and Vĩnh Long in the southern Mekong delta. In four of these communes, 26% to 62% of local households were classified as belonging to ethnic minorities. Research methods included household survey, facility survey, client exit survey, and in-depth interviews, all of which were used in both round 1 in 2008-09 and round 2 in 2013-14. They also included a case study of CHCs and other health care providers in 12 studied communes. This method was used in all 12 communes in 2013-14, and on a more limited basis in 2011 and 2016. For analytical purposes, the six communes with more investments in their CHCs are called the more treated communes, and the rest, the less treated communes.

The more treated communes witnessed overall more positive changes in preventive health behavior (the percentage of pregnant mothers taking iron supplements for at least three months), as well as better self-reported health by surveyed respondents. However, our household survey data reveals that between 2008-09 and 2013-14, the percentage of surveyed commune population choosing CHCs for acute illness treatments dropped in 10 out of 12 communes, including in all of the six more treated communes. For chronic illnesses, it dropped in seven out of 12 communes, including in four of the six more treated ones. The overall declining percentage of local patients choosing CHCs for their illnesses resulted from the increase in private health care providers, higher per capita income, and better roads and greater means of transportation. This trend will continue, especially in the context that the government-established health insurance program allows health insurance policy holders direct access (without CHC referrals) to district hospitals as of January 2016, and to provincial hospitals as of 2020. Despite the overall decline in the percentage of local population choosing CHCs, our data show that disadvantaged members of local populations (the poor, the less educated, ethnic minorities, and the elderly) continued relying more heavily on CHCs than on other health care providers.

We examine in depth the significant variation in CHCs' ability to attract clients, despite similar levels of investments. Among the twelve CHCs studied in depth, the two most successful CHCs pulled far ahead of other more treated ones, and of all less treated ones, in terms of attracting more patients, including clients from afar without health insurance and those paying out of their own pockets. Our case study analysis suggests that the ability of CHCs to attract

patients depended as much on CHC leadership and management as it did on the investments in CHCs' physical infrastructure, high-tech equipment, and staff expertise, and on the specific programs supported in reproductive health and maternal and child health. Thus, investments are necessary but not sufficient for optimal success of the CHC model. Among the 12 CHCs studied in depth, the most successful CHC (VL3) had in 2013-14 a patient caseload per capita at least six times higher than a less successful CHC with a similar level of investments. VL3 CHC attracted many self-paying patients from surrounding communities on the basis of its high-quality services and the reputation and sound management of its leader. It established a centrally-pooled income fund to hire additional staff members, to improve CHC physical infrastructure, to provide significant additional income to its staff, and to increase staff members' dedication to the CHC and its quality services. With good additional income from the CHC, VL3 CHC staff did not have their own private medical services, as is common elsewhere. They provided a strong backup for one another in the provision of health care services to CHC clients. When the national health insurance (HI) system allowed HI patients direct access to district hospitals in January 2016, VL3 CHC continued attracting more patients while many other CHCs lost patients despite having received considerable investments.

Among different types of investments in CHCs, the program in maternal and child health had a greater positive impact on patients' choices of CHCs over other health care providers for acute and chronic illnesses. High-tech equipment and a program in reproductive health with free high-quality services also had a positive overall impact. A fee-charging reproductive health program did not have an impact on the choices among health care providers for acute and chronic illnesses, although reproductive health programs in general made a statistically significant contribution to the rise in the percentage of women taking iron supplements for at least three months during pregnancy. A new or renovated CHC building, which many interviewees mentioned in a positive way, did not have a statistically significant positive impact on the choice of CHC over other health care providers.

Given the importance of leadership and management in the success of CHCs, we suggest that national policies need to be more flexible in CHC regulations, to provide incentives for good local initiatives, and to consider more differentiated models of CHCs for different areas of Vietnam (urban and peri-urban areas vs. mountainous regions vs. rural areas).

In Vietnam, approximately 11,000 health centers in communes, rural towns, and urban wards (hereafter referred to as commune health centers or CHCs) form the grassroots public health care system. CHCs provide basic-level preventive care as well as initial diagnoses, treatments, and referrals to higher-level public hospitals. As a part of the strategy to reduce the overload at these hospitals, to improve population health, and to strengthen human resources for sustainable development, the Vietnamese government and international donors have made significant investments in CHCs, especially in the countryside, since two-thirds of the Vietnamese population currently lives in rural areas. Other important components of this strategy include universal health insurance coverage and the recent adoption of the family doctor model for CHCs.[1]

This report assesses the impact of investments in CHCs by The Atlantic Philanthropies, the Vietnamese government, and other international donors. We make this assessment on the basis of a panel survey and a longitudinal study from 2008 to 2016 in 12 communes in three Vietnamese provinces: Thái Nguyên in the north, Khánh Hòa in the central coast, and Vĩnh Long in the southern Mekong Delta.

Our study suggests that investments in facilities and equipment, in strengthening staff expertise, and in improving attitudes towards patients are very useful, but not sufficient, for improving CHC services and health in the population. The study also suggests the importance of CHC leadership and management. From a policy perspective, our study suggests the need for greater flexibility in the CHC model, allowing for more local initiatives, and a further differentiation of CHC models, taking into account geography and local population demographics.

I. BACKGROUND AND RESEARCH DESIGN

1. Commune health centers in the Vietnamese health care system

In 2013, of the 11,000 CHCs in Vietnam, approximately 9,500 were located in communes and rural towns with populations in the 2,000-15,000 range.[2] CHCs provide basic-level preventive care, such as immunization for all children, as well as initial diagnoses, treatments, referrals to district or provincial public hospitals, and birth deliveries as necessary. CHCs also dispense health insurance medications and sell other medications.[3] The Vietnamese government's recent family medicine model for CHCs is part of the strategy to strengthen curative care at CHCs (Decision No. 2348/QĐ-TTg in December 2016, see Đào Thị Khánh Hòa

[1] The October 27, 2015 Circular No. 33/2015/TT-BYT from the Ministry of Health emphasizes that CHCs need to provide a fuller range of services, including examination, treatment, and rehabilitation in accordance with their assigned technical level and professional activities.

[2] The population of a commune could be under 1000 in remote islands or mountainous areas, and could be as high as 20,000.

[3] In the 1990s, in line with the Bamako Initiative, international governmental and non-governmental organizations gave medications to a number of CHCs in order to improve drug supplies to rural population. These medications were provided free to CHCs only at the beginning, and a CHC had to sell them at cost and, with the sale revenues, to re-stock its medication cabinet.

2017: 36-37). Most CHCs have five to nine staff members each, as well as networks of part-time outreach health workers at the village/hamlet level (*y tế thôn bản*).[4]

In 2013, in the 12 communes studied, CHC staff salaries plus bonuses started at 3.77 million VND per month (equivalent to 178 USD), or 2,134 USD per year, compared to an annual per capita income of 904 USD in rural Vietnam in 2012 (Vietnam-GSO 2014: 202).[5] They were as high as 245 USD per month, or 2,940 USD per year, for senior CHC staff. [6] For a 24-hour special shift at the CHC, a staff member would receive 25,000 VND (1.18 USD) during the week and 32,500 VND (1.53 USD) on the weekend.[7]

In 2013-14, many CHC staff members in the studied communities continued their long-standing and government-allowed practice of offering private services outside CHC hours in order to earn additional income. These services ranged from the sale of medication to first aid, injection, fluid transfusion, and ultrasound scanning. While these private practices normally took place outside CHC hours and at home, in 2013, staff members at some CHCs were observed to sell their own medications at CHCs or to come to work late or to leave work early for their private income-generating services (see also World Bank 2016: 48, 51-52, 62). This moonlighting in CHC work and the low quality of CHC services formed a vicious cycle, as clients at times could not get the desired services at CHCs due to absent health workers.

For its preventive and basic curative care obligations, in 2013-14, besides staff salaries and bonuses, a CHC received about 20 million VND (944 USD) per year for its operational expenses, including utilities and supplies.[8] It also received some compensation from Vietnamese health insurance (HI)[9] every quarter for selected out-patient services to HI policy holders. For

[4] A Vietnamese rural commune has many *thôn* ("village", with a sense of collective social identity, for northern and central lowlands), or *bản* ("village" for the highlands), or *ấp* ("hamlet", an administrative unit, for southern Vietnam). The terms "village" or "hamlet" are used interchangeably in this report.

[5] Starting in 2011, medical staff bonuses ranged from 40% of their salaries to 70% for those involved in high-risk care, like dealing with HIV and tuberculosis patients (Government Decree No. 56/2011/NĐ/CP). In Khánh Hòa province, the bonus for medical staff with university degrees serving in mountainous areas amounted to 100% of their salaries.

[6] In 2008, when the first round of our study was launched, CHC staff's official income from the CHC started at 1.58 million VND (100 USD) a month. This figure included salary and a 25% bonus for working at a rural CHC (Government Circular No. 02/2006/TTLT-BYT-BNV-BTC). At that point, the pay for a 24-hour medical shift was 10,000 VND (0.63 USD) during the week and 13,000 VND (0.82 USD) on the weekend. According to the household living standards survey, average rural per capita income was 9,146,400 VND (552 USD) a year in 2008 (GSO 2010: Table 5.1).

[7] The pay for a 24-hour shift increased to 115,000 VND ($5.43) at a special central hospital (Government Decree No. 73/2011/QĐ-TTg).

[8] KH2 CHC reported receiving 35 million VND (1,652 USD) in 2013 for its operational expenses because it had a branch in the commune. In 2017, operational non-salary funds for CHCs began varying more significantly, as they were determined by provincial departments of health and might vary with CHC staff numbers or with commune population (*Thời báo tài chính* online 16 Aug 2017).

[9] The Vietnamese government establishes the Vietnamese health insurance program. Enrollment in the health insurance system could be:

1. Government-funded: universal for children under six and the elderly above the age of 80, subsidized for people in officially classified poor and close-to-poor households and in ethnic-minority communes, and for people with important contributions to the Communist-led Vietnamese Revolution
2. Compulsory: through employers, for currently employed people. If meeting the condition of HI enrollment duration through employment, retirees also have HI benefits in their retirement.

example, in 2013-14, a CHC in the southern province of Vĩnh Long nominally received 4,000 VND (0.19 USD) for such a service (e.g., HI drug dispensation, initial diagnosis, and referral to district hospital). However, after accounting for overhead of the district health center and the deduction for supplies, the amount was reduced to about six US cents on average (32.5% of the HI payments).[10] CHC staff routinely complained about a lot of paperwork for a pitiful amount of money from Vietnamese health insurance. Many said that they provided services to HI policy holders only as required by the Vietnamese government. If a CHC provided a service not covered by HI at the CHC level, such as an ultrasound scan, acupuncture, or birth delivery, or a service outside regular office hours or to people without health insurance, it could retain 100% of patients' payments.

The national HI coverage rate increased from 42% in 2008 to 69% in 2013 and 81.7% in 2016 (see Figure 1). In the 12 communes studied, it increased modestly from 61.4% in 2008-09 to 67.7% in 2013-14. The higher rate of HI coverage in these communities in 2008-09 reflects the fact that four of the 12 study communes are in mountainous areas, with sizeable ethnic minority populations who received government-subsidized health insurance. The government of Vietnam aims to provide universal health insurance coverage.

People holding health insurance policies must register them at any commune/ward health center or at a district hospital. During most of our research period, policy holders had to start at the unit of registration in order to receive full HI benefits. A fairly high percentage of HI policy holders chose to pay out of pocket due to their belief in the poorer quality of HI medication or its unavailability (towards the end of the month), or in the better equipment or the stronger expertise of medical staff at facilities where they were not registered (Đăng Nguyên Anh, Nguyễn Đức Vinh, Nghiêm Thị Thủy 2017). (According to HI regulations, the number of types of HI medications available at a CHC depends on whether a CHC has a physician on staff or not.)

As of January 1, 2016, people with health insurance could go to any CHC or district hospital in their own province (*chính sách thông tuyến*).[11] As a result, a number of patients skipped the CHC due to their belief in the greater availability of medication and in better medical expertise at district hospitals. The percentage of HI patients' visits to CHCs declined from 28.3% in 2014 to 19.9% in 2017, according to official statistics (Thùy Linh 2018).

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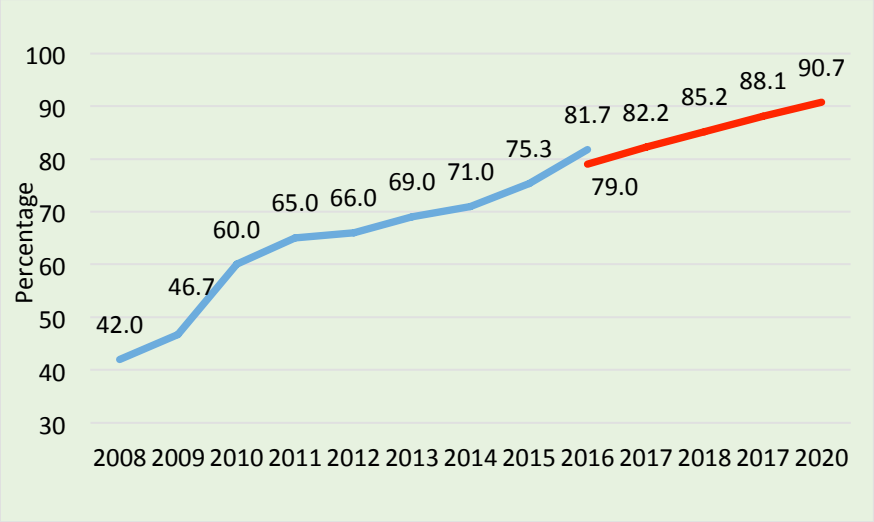
3. Quasi-compulsory: students from grade one to college/university
4. Voluntary: as of 2015, sold only to entire households and not to individuals.

[10] In 2013-14, HI payments for services at CHCs varied from one province to another, as they were decided by provincial authorities. It was 3,000 VND in the northern province of Thái Nguyên, 5,000 VND in the central coastal province of Khánh Hòa, and 4,000 VND in the southern province of Vĩnh Long. By 2016, the compensation from Vietnamese health insurance to a CHC had increased to 7,000 VND (0.31 USD) per service. In 2018, as a result of the Vietnamese government's policy on full-cost charges for health care, the rate increased to 23,300 VND (1.05 USD) per service at CHCs in the provinces where this program had been implemented. However, as these full-cost charges were supposed to eventually cover staff salaries, this policy may lead to problems for CHCs with small numbers of patients, as the total payment to a CHC may not be sufficient to pay for staff salaries. But it may benefit CHCs with large numbers of patients and a small staff (*Thời báo tài chính* online 16 August 2017).

[11] According to the government's plan worked out in conformity with the 2014 health insurance law, in 2020, HI policy holders on their own could go to any CHC or hospital in their own province.

Figure 1. Rates of health insurance coverage in Vietnam, 2008-2016 and target to 2020



Source: Đăng Nguyên Anh, Nguyễn Đức Vinh, and Nghiêm Thị Thủy 2017: 2

2. Investments in commune health centers

Both the Vietnamese government and international donors have given a high priority to health care, in order to strengthen human resources for development and as an end in itself. Among international donors, The Atlantic Philanthropies (AP) is the leading international non-governmental organization with systematic programs and important investments in the health sector. Many of these investments by AP, other donors, and the Vietnamese government are in CHCs in rural Vietnam where two-thirds of the Vietnamese population live. These investments are not only in the facilities and equipment, but also in strengthening medical staff expertise and professional attitudes through training programs.

From 1999 to 2013, AP provided 382 million USD for various programs in Vietnam, of which 100 million went to higher education and about 280 million went to the health sector (Parker 2013: 3).[12] From 2004 to 2013, AP implemented programs to strengthen primary health care, which started with constructing CHC buildings and supplying high-tech medical equipment in order to strengthen the physical infrastructure of CHCs. 477 CHCs in seven Vietnamese provinces and in Đà Nẵng municipality were rebuilt or renovated with AP funding (cf. Hoang 2018: 22).[13] A typical AP-funded CHC building has two stories and 14 rooms. Among the 12 CHCs studied, AP-funded high-tech equipment included the black-white 2D ultrasound machine (to 6/12), electrocardiograph machine (10/12), hematology blood analyzer (2/12), blood centrifuge (3/12), blood-testing equipment (2/12), and diabetes testing equipment or urine analyzer (7/12).[14]

[12] AP funding includes grants to foreign universities and organizations operating in Vietnam, as well as to Vietnamese agencies. The Vietnamese end reported 259 million USD from AP in the 1999-2013 period (Đôn Tuấn Phong 2018: 187).

[13] 448 of these 477 AP-funded CHC buildings are in predominantly rural provinces. They make up about 4.5% of Vietnam's rural CHCs.

[14] Other funding sources provided blood- and diabetes-testing equipment respectively to five and two of the 12 CHCs chosen for our study.

Figure 2. Interior of commune health center before and after intervention

AP also funded programs in maternal and child health. For example, the Marie Stopes International (MSI) program aimed to provide good quality and community-oriented reproductive health care services and family planning. It included the "Sisterhood" branded counselling room at the CHC, staff training in reproductive health and service quality, and social marketing. The "Sisterhood" program of MSI in TN1 and KH1 communes provided fee-based reproductive health and family planning products and services. While the AP-leveraged "Sisterhood" program in VL3, funded by the European Union, operated with the same principle, in reality, it differed significantly from those in the two former communes since it provided 1,300 vouchers for free reproductive health services to married women age 15 to 49, as well as a small allowance for transportation to the CHC for MSI services. These Sisterhood program vouchers in VL3 were valid from January 2011 to April 2012. The Save the Children (SC) program aimed at providing a continuum of high-quality care to mothers and newborn from the home to the hospital. With investments at all levels, from the hamlet or village to the CHC, and to the district and provincial hospitals, this program included the following components: newborn care unit at the district hospitals; essential equipment; training in essential newborn care and emergency obstretics care; behavior change communication training for village health workers (VHWs) and CHC staff; and supporting outreach to households by VHWs.

Figure 3. Interior of commune health center before and after intervention, "Sisterhood" (Tình chị em) branded room for reproductive health services

AP also funded the family doctor training program. It aimed at developing a model for family medicine training, as well as building a family-medicine-based primary health care

system with information flowing between the CHC and upper levels. After being trained, the family doctor would work at the CHC and counsel and treat patients or refer them to other health care providers. The patient is to be referred back to the doctor after treatment by other health care providers, and the doctor would continue monitoring the patient's health and manage the patient's medical file. Computers and software programs were provided to facilitate the management of medical treatment information at the grassroots level and to improve patient care.

AP funding and interventions took place at CHCs in seven provinces and Đà Nẵng municipality. Among the three study provinces, they started earlier in Khánh Hòa province (2004-12), followed by funding and interventions in Thái Nguyên (starting in 2008) and Vĩnh Long province (2009-13). The funding and new programs supported by AP and other donors at the CHCs in 12 studied communes are summarized in Table 1. In our analysis, points are given to each intervention as follows: 0 point for not having the intervention, 0.5 point for having some part of the intervention, and 1 point for having the full intervention. The score for each commune is based on interview and participant observation data collected by the case study team. For our analyses of interventions and their effects, the 12 surveyed communes were divided into two groups: the **more treated group**, which includes six communes (names in red) with more interventions (at least four points); and the **less treated group**, which includes six communes (names in black) with less interventions (below four points).

Table 1. Assessing the amount of interventions in CHCs in 2013-14

Interventions by AP, other donors, and the Vietnamese government	THÁI NGUYÊN				KHÁNH HOÀ				VĨNH LONG			
	TN1	TN2	TN3	TN4	KH1	KH2	KH3	KH4	VL1	VL2	VL3	VL4
1. Construction of CHC buildings and supply of essential equipment	0.5	0.5	0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2. High-technology equipment, laboratory testing and training	0.5	0.5	0.5	1.0	1.0	0.5	0.0	0.0	1.0	1.0	1.0	1.0
3. Household-to-hospital continuum of care for mothers and newborns (Save the Children)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0
4. Sisterhood social marketing: Reproductive health care/family planning (MSI)	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
5. Health management information system	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0
6. Family medicine doctor training	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total (points)	**4.0**	**3.0**	**2.5**	**4.0**	**5.5**	**3.0**	**2.5**	**2.5**	**4.0**	**4.0**	**4.0**	**3.0**

Source: Data of Case Study Team from 12 surveyed communes

From 2008-09 to 2013-14, the population in the 12 studied communes benefited not only from improved CHC facilities and services, but also from an increase in private health care

providers in their communes (Table 2).[15] They also had better access to other health care providers at the district and provincial levels thanks to improved means of public and private transport, better roads, and generally improved household income. In other words, by 2013-14, the clients of the health care system in Vietnam had a considerably wider range of choices among both public and private health care providers, not only within their localities, but also well beyond. For example, with higher income, fewer children, and better transportation, more and more rural households preferred to have pregnant female family members give birth in health care facilities where staff demonstrated superior obstetrics expertise. More households were willing to pay more for such services, and less willing to accept midwives' standard delivery services at CHCs. The preference of many better-off medical clients and their family members for quality services led to severe overcrowding at district, provincial, and especially central hospitals. In this context, in order to reduce the patient overload at higher levels, the Vietnamese government paid increasing attention to the curative care potential at CHCs and the family doctor model, besides the preventive medicine provided by CHCs.

Table 2. Number of private health care providers (including pharmacies) in surveyed communes

Commune	Western medicine 2008-09	Western medicine 2013-14	Western medicine differences 2008-09 and 2013-14	Traditional medicine 2008-09	Traditional medicine 2013-14	Traditional medicine differences 2008-09 and 2013-14
TN1	4	10	**6**	6	8	**2**
TN2	7	7	**0**	8	8	**0**
TN3	9	11	**2**	7	8	**1**
TN4	1	3	**2**	3	3	**0**
KH1	2	5	**3**	3	3	**0**
KH2	14	15	**1**	3	3	**0**
KH3	3	3	**0**	1	1	**0**
KH4	7	7	**0**	0	0	**0**
VL1	6	12	**6**	2	3	**1**
VL2	5	13	**8**	11	10	**-1**
VL3	7	14	**7**	4	4	**0**
VL4	2	2	**0**	2	2	**0**

Source: Data of the case study team from the 12 surveyed communes

3. Research design to assess investment impact

From 2008 to 2016, the Social Science Research Council (SSRC) and the Vietnamese Academy of Social Sciences (VASS) conducted a longitudinal study and a panel household survey to assess the effectiveness of investments in CHCs. By comparing changes in CHCs, the health of the local population, and health clients' choices among health care providers over at least half a decade, and with close attention to the great variation in performance among CHCs with similar investments, the study addresses questions on how investments in CHCs have affected clients' choices among different health care providers for their acute and chronic illnesses, as well as what other factors besides these investments have made a critical difference in the performances of CHCs and their ability to attract health clients.

[15] These data were carefully collected in each community by the case study team. The four communes without any growth in Western medicine providers (TN2, KH3, KH4, and VL4) are all close to provincial capital or district seats which have numerous health care providers.

We conducted a baseline study in 2008-09 (round 1 or R1) and a follow-up in 2013-14 (round 2 or R2), in the three provinces of Thái Nguyên, Khánh Hoà and Vĩnh Long (four communes in each province for a total of 12 communes). Within each province, two districts were chosen, one with a poverty rate clearly above the provincial average and the other with a rate below the provincial average; within each district, two communes were chosen.[16] Half of the communes have hilly or mountainous terrains. In four of these 12 communes, between 26% to 62% of local households were classified as ethnic minorities. We used a combination of methods for data collection:

- Household survey: In round 1, a survey was conducted with 3,600 households in Thái Nguyên, Khánh Hòa, and Vĩnh Long, with 300 households in each commune chosen using probability sampling. In 2013-14, the panel survey (round 2 or R2) included 3,921 households (including 2,979 households surveyed in R1, as well as automatically adding households splitting off from R1-surveyed households and residing in the studied communities).
- In-depth interviews in households with sick people: In R1, in each commune, 30 households with members who had recent acute or chronic illnesses were chosen for in-depth interviews, half economically better off and half poorer. In R2, we used the same quota sampling method, giving priority to R1-interviewed households, but we enlarged the interview sample to 525 households for two reasons. First, we added 72 mothers who had given birth in the previous 24 months (six cases in each commune). We also added a number of R1-interviewed households without any acute or chronic illnesses in the 12 months preceding R2 research.
- Exit interviews and client surveys: We conducted a survey of CHC clients at exit in both rounds (720 in R1 and 1,055 in R2) in order to obtain fresh information on patient satisfaction with CHC and alternative provider services.
- Facility survey of all 12 CHCs as well as one public polyclinic located in a studied commune and functioning like a second CHC in this commune, with wide-ranging information on infrastructure, equipment, available medication types, to personnel (training, expertise, etc.). (In our survey data analyses, we consider people visiting this polyclinic as having visited a CHC.)
- After a pilot case study of CHCs and other health care providers in two communes in 2011 in Khánh Hòa province, the case study method was used in all 12 communes in 2013-14. The case study team conducted research in all 12 CHCs through participant observation and interviews at CHCs, as well as at selected private health care providers in the 12 studied communes. The case study team also conducted interviews with local authorities, officials, village health workers, as well as with managers above the commune level within the health sector. As the Vietnamese government implemented the policy of free choice for health insurance policy holders at the district and commune levels (*chính sách thông tuyến*) in January 2016 (Circular No. 37/2014/TT-BYT), the case study team revisited four CHCs—two in the north (one more treated and the other less treated) and two in

[16] Two communes in each district were chosen by stratified sampling on the basis of poverty rates and the distance to a highway and to the district health center.

the south (one more treated and the other less treated)—in the last quarter of 2016 to assess the impact on this policy on CHCs. The team also conducted telephone interviews with staff members at one more treated CHC in Khánh Hòa on the impact of this free-choice policy on the flow of clients to that CHC.

II. IMPACT OF INTERVENTIONS IN COMMUNE HEALTH CENTERS

The investments in CHCs have enhanced their ability to offer better health care, especially to the disadvantaged in local populations. People in more treated communes have also reported better health than those in less treated communes.

However, not all the investments have been equally effective. Neither have all the more invested CHCs been able to make effective use of the investments by international donors and the Vietnamese government. An in-depth case analysis suggests that among additional factors at work, leadership and management skills played major roles in accounting for the significant performance variation among the CHCs in more treated communes.

1. Improvement in preventive health care and reported health in more treated communes

a. Preventive Care: The impact of AP interventions on pregnant women's antenatal care

We assess the impact of AP interventions (MSI, SC, or the equipment program) or similar interventions on women's antenatal care by comparing the increase between two rounds in the percentage of women taking iron supplements for a minimum of three months during pregnancy, and by further comparing the behavior of pregnant women in communes that implemented at least one of those three interventions in maternal and child health preceding their delivery with the behavior of their counterparts in non-intervention communes or communes with interventions only after their delivery.[17] In other words, in the same commune, the antenatal care behavior of a pregnant woman before intervention and that of another after intervention are put into two different groups: without intervention and with intervention.

Table 3 shows that in the intervention group, the percentage of pregnant women taking iron tablets for at least three months during pregnancy increased by 41 percentage points, from 22.7% in 2008-09 to 63.7% in 2013-14. In the no-intervention group, it increased by only 21.3 percentage points (increasing from 49.8% to 71.1%). The difference between the increases of the two groups is 19.7 percentage points (41% vs. 21.3%). (In technical social science terminology,

[17] Nguyễn Hữu Minh *et al.* conducted a similar analysis regarding pregnant women having at least four antenatal care visits (see Table A1 in Appendix A). (WHO and UNICEF recommend at least four antenatal care visits for pregnant women, while the Vietnamese Ministry of Health recommends three (see Nguyễn Hữu Minh, Trần Quý Long, and Trần Thị Hồng 2017: 62-63). In the intervention group, the percentage of women having at least four antenatal care visits increased by 43.7 percentage points, from 16.3% in 2008-09 to 61% in 2013-14. In no-intervention group, this change for the same period was only 25.7 percentage points (increasing from 38.4% to 64.1%). The difference between the increases of the two groups was 18 percentage points (43.7% - 25.7%). However, regression analyses show that this change in pregnant women's antenatal care behavior resulted from higher income and the availability of ultrasound machines at private health care providers, not from AP-funded programs (Nguyễn Hữu Minh *et al.* 2017: 69).

this is known as difference-in-difference [DD], difference between time 1 and time 2 in group 1, minus the difference between time 1 and time 2 in group 2.)

Table 3. The differences between the two rounds in the percentage of pregnant women age 15-49 years taking iron supplements, by intervention in maternal and child health

	No Intervention (Not Treated)			Intervention (Treated)			DD (Treated - Not Treated)
	R1	R2	**R2-R1**	R1	R2	**R2-R1**	
Taking iron supplements for at least 3 months	49.8	71.1	**21.3**	22.7	63.7	**41.0**	19.7

Source: Nguyễn Hữu Minh, Trần Quý Long, and Trần Thị Hồng 2017: 72

Statistical regression analyses, which control for the impact of other important variables like wealth, mother's education and occupation on the behavior under analysis, show that the AP-funded MSI program (or another donor's similar program) had a statistically significant impact on the antenatal care behavior of taking iron tablets for at least three months during pregnancy (Nguyễn Hữu Minh, Trần Quý Long, and Trần Thị Hồng 2017: 70).[18] Nguyễn Hữu Minh *et al.*'s analysis of in-depth interviews show that reproductive health programs with an outreach component, funded by AP and other donors, provided many pregnant women with essential knowledge on antenatal and postnatal care. The MSI program (or another donor's similar program) contributed to improving preventive care for pregnant women (see also Nguyễn Hữu Minh, Trần Quý Long, and Trần Thị Hồng 2017: 68-71).

b. Change in self-reported health

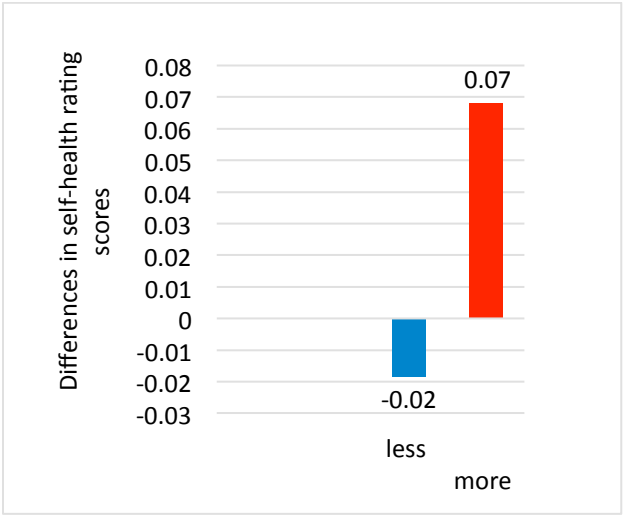
A higher percentage of surveyed respondents reported better health in more treated communes than in less treated communes (Tanur 2017). Overall, we see in Figure 4 that the self-reported health increased significantly in more treated communes ($p < .01$) and decreased slightly (but not statistically significantly) in less treated communes.[19] A breakdown by gender, economic conditions, and ethnicity (see Figure 5) shows that there were no statistically significant changes in self-reported health in less treated communes, and statistically significant changes for females, the better-off[20], and both Kinh (ethnic Vietnamese) and ethnic minorities in more treated communes. (The anomaly is that a higher percentage of the elderly reported better health in less treated communes than in more treated ones.)

[18] Nguyễn Hữu Minh *et al.*'s same regression analyses suggest the Save the Children (SC) and high-tech equipment programs at CHCs did not have statistically significant impact on pregnant women's antenatal care behavior.

[19] We asked respondents to rate their own health on a 5-point scale, with 1 being healthiest and 5 being the least healthy. We reversed the scale in the analysis so that higher numbers represent better self-reported health. The general research literature has shown that such self-ratings correlate quite highly with objective measures of health status (Tanur 2017).

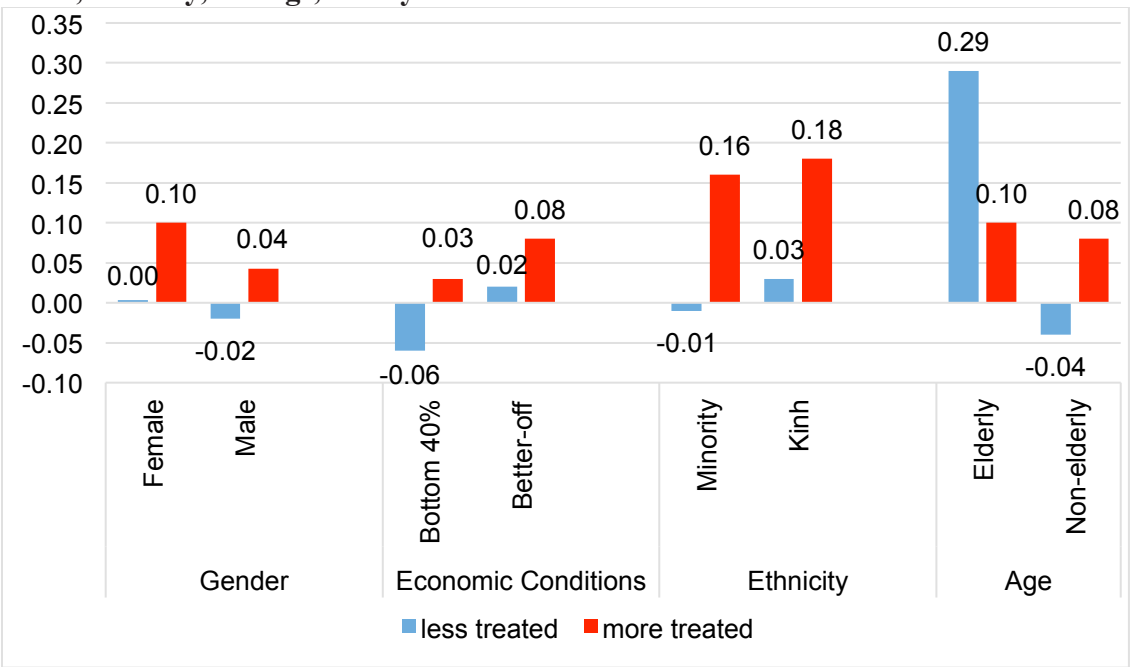
[20] For this analysis of self-reported health by socio-economic status, the principle component method (factor analysis) was used to construct the socio-economic status index (SES), based on household survey questions on housing conditions (villa, permanent, semi-permanent, or make-shift housing), water sources, toilet types, and 16 household assets (TV, video/DVD player, radio, computer, telephone, refrigerator, air conditioner, washing machine, hot water heater, water pump, rice milling machine, motorbike, bicycle, car/truck, and boat). Based on the index values, Tanur divides households into the bottom 40% and the better-off for her analysis of the changes in self-reported health.

Figure 4. Improvement in self-reported health status between 2008-09 and 2013-14 by treatment level of commune



Source: Tanur 2017

Figure 5. Change in self-reported health between 2008-09 and 2013-14 by gender, economic conditions, ethnicity, and age, and by level of treatment

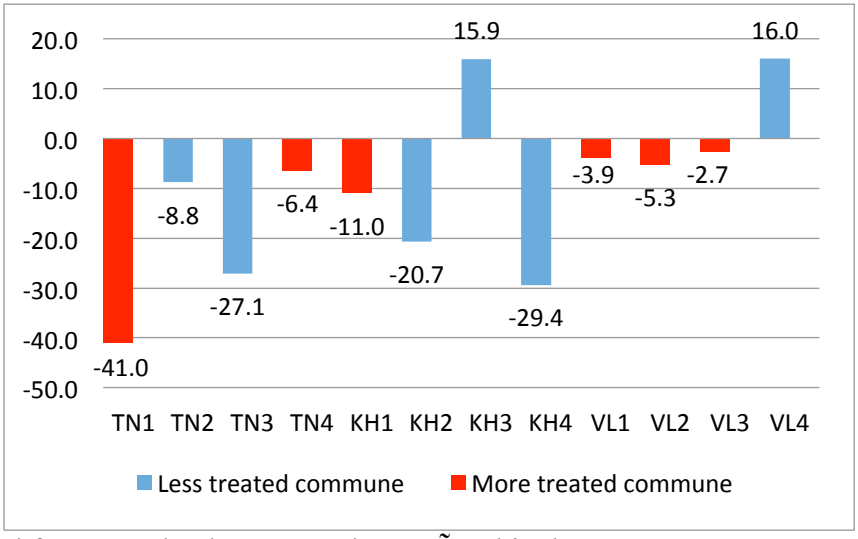


Source: Tanur 2017

2. Role of Commune Health Centers in Rural Health Care

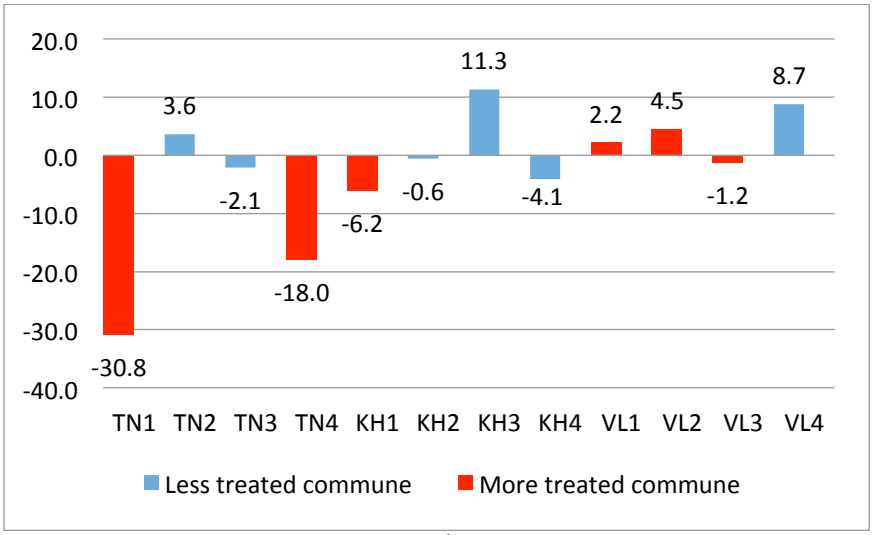
Household survey data in two study rounds show a major change from 2008-09 to 2013-14: a decreasing percentage of people with acute illnesses seeking care at CHCs. This percentage dropped in all but two communes (KH3 and VL4). The decline was as much as 40% in TN1 (a more treated commune) (see Figure 6). For chronic illnesses, while the percentage seeking care at CHCs similarly rose in KH3 and VL4, and also dropped 30% in TN1, the percentage seeking care at CHCs suffered only a small decline overall. It rose in five communes and dropped in seven others (see Figure 7). This results from the fact that the elderly, over-represented among the chronically ill, change their health care providers less than younger people.

Figure 6. Change in percentage of people with acute illness seeking care at CHCs, 2008-09 and 2013-14



Source: Adapted from Lê Thanh Sang and Nguyễn Thị Nhung 2017

Figure 7. Change in percentage of people with chronic illness seeking care at CHCs, 2008-09 and 2013-14



Source: Adapted from Lê Thanh Sang and Nguyễn Thị Nhung 2017

The decreasing percentage of individuals in the surveyed households seeking care for acute illnesses at CHCs from 2008-09 to 2013-14 resulted from larger changes in household welfare and in society and the economy, such as better transportation to health care providers at district, provincial, and national levels; better economic conditions, allowing people to choose private health care services and upper-level health care providers despite a higher cost to themselves; strong growth in the number of private health care providers and private drugstores (particularly Western medicine) in most communes (Table 2). The decrease in the use of CHCs may continue in the future with better transportation, higher income levels, and more health care providers, all of which allow people more choices among health care providers.

However, for both acute and chronic illnesses in the 2008-2014 period, CHCs remained an important health care provider for the disadvantaged (females, poor, and the elderly). (It is a mixed picture for ethnic minorities in comparison to ethnic Vietnamese and ethnic Chinese.)

In more treated communes, as seen in Figure 8, between 2008-9 and 2013-14, *for acute illnesses*, women's CHC usage dropped less than men's; the poor's, less than the non-poor's; and the elderly increased their use of CHCs while the non-elderly decreased their use of CHCs. For *chronic illnesses*, the same patterns existed among men and women, and the poor and the non-poor; while the elderly's CHC usage dropped less than the non-elderly's (see Figure 9).[21] (On the ethnic dimension, it was a mixed picture. For acute illnesses, ethnic Vietnamese increased CHC usage, while minority clients decreased their use of CHCs. For chronic illnesses, ethnic minority people increased their use of CHCs more than did ethnic Vietnamese and Chinese (see Figures 8 and 9).)

In less treated communes, for the same period, for *acute illnesses*, the elderly increased their use of CHCs while the non-elderly decreased their use of CHCs; and there was virtually no change for either females or males. However, the non-poor increased their use of CHCs while the poor and both ethnic Vietnamese and ethnic minorities decreased their use of CHCs (see Figure 8). For *chronic illnesses*, both women and the elderly increased their use of CHCs, while men and the non-elderly decreased their use of CHCs. There was virtually no difference, with no change over time, between the poor and non-poor. There was only a very small difference between minority and ethnic Vietnamese, with both slightly decreasing their use of CHCs (see Figure 9). (Thus, on the ethnic dimension, the picture was mixed in both more treated and less treated communes.)

[21] Professor Vũ Mạnh Lợi kindly provides the data for figures 8 and 9. For these 2 figures and in his own publication (Vũ Mạnh Lợi 2017), he uses the local classification of poverty which was supposed to be based on the Vietnamese government's rural poverty lines of 2.4 million VND per person a year in 2008-09 and of 6.24 million VND per person a year in 2013-14. The latter figure was the government's near-poverty line. The figure of 6.24 million VND in 2013-14 represents an increase of 160 per cent over the 2008-09 one of 2.4 million VND. Household living standard surveys also reveal that per capita income in 2014 in the three provinces of Vĩnh Long, Thái Nguyên, and Khánh Hòa increased by 145 per cent to 176 per cent over that in 2008 (Vietnam, General Statistical Office 2016: 321, 325, 329).

Figure 8. Change between 2008-09 and 2013-14 in the choice of CHC for acute illnesses by gender, economic conditions, ethnicity, and age, and by level of treatment

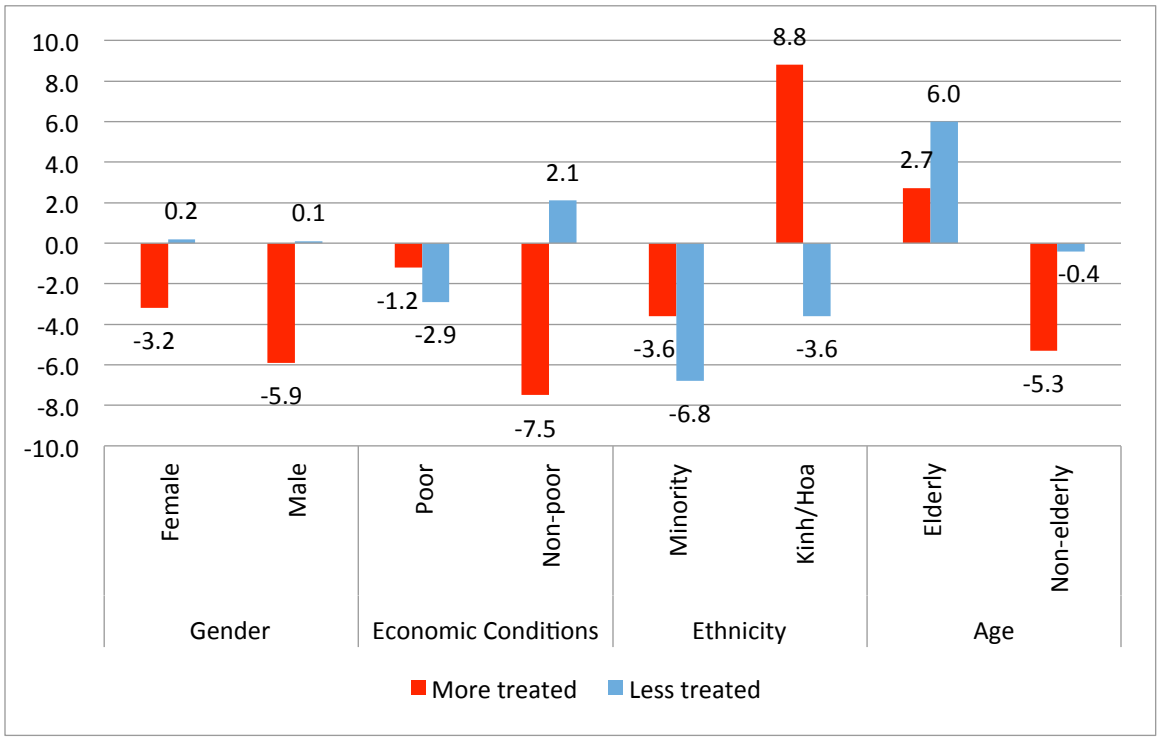
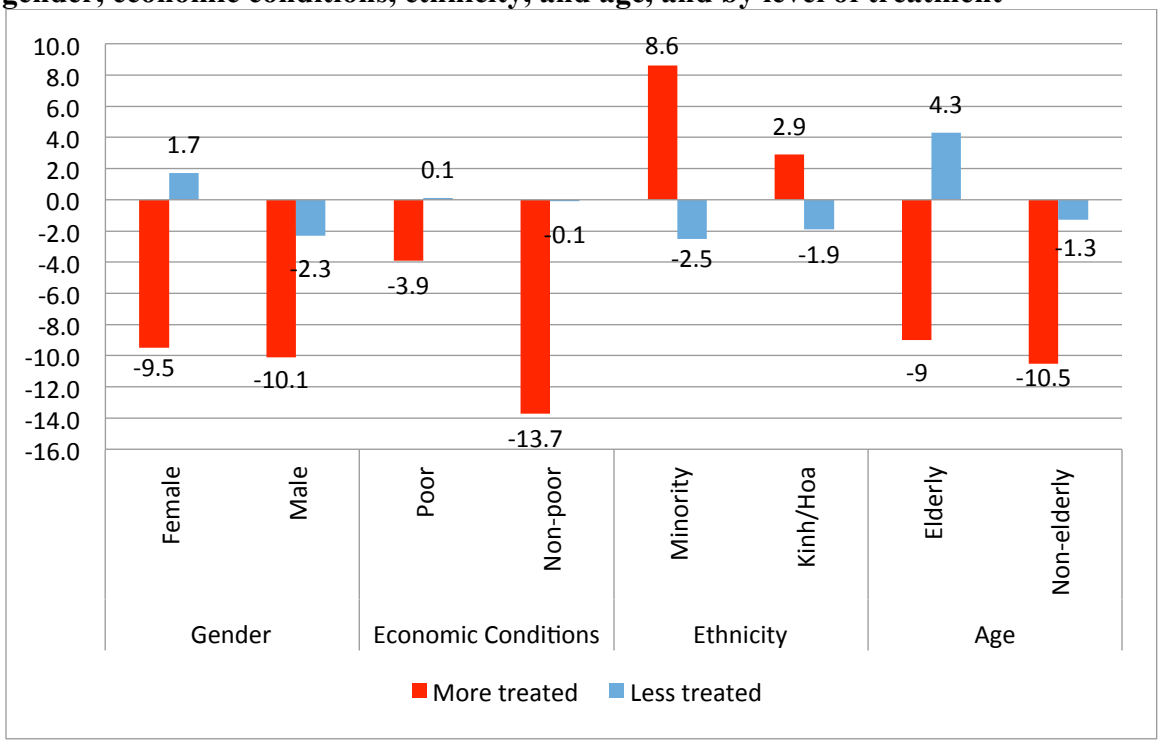


Figure 9. Change between 2008-09 and 2013-14 in the choice of CHC for chronic illnesses by gender, economic conditions, ethnicity, and age, and by level of treatment



3. *Choices among health care providers: impact of interventions in CHCs and of other factors*

When it came to local people's choices among health care providers for their acute and chronic illnesses, our survey data in two rounds show that investments in CHC building, equipment, professional expertise, and programs constituted only one set of factors at work. These investments yielded a wide variety of results. The TN1 CHC received more investment, but local patients voted with their feet, and this CHC suffered the steepest decline in the percentage of acute and chronic illness patients among all of the studied CHCs. At the other end of the spectrum, in KH3, despite much less investment, a higher percentage of acute and chronic illness patients chose the CHC in 2013-14 than 2008-09 (see Figures 6 and 7).

In-depth interviews with patients and their family members suggest that people's choices among health care providers are shaped by diverse factors, including medical problems, local environment, CHC conditions and leadership (see Đào Thị Khánh Hòa 2017).

People's medical problems play a major role in shaping their search for solutions. For a minor cold with a common low-cost solution like acetaminophen purchase[22], or with traditional no-cost treatment like hot vapor all over the body, it is not surprising that people may go straight to the pharmacy close to home or adopt a traditional home solution, instead of going to CHC. For a major health concern like childbirth, with declining fertility and higher leveles of income, it is not surprising either that more and more people, for peace of mind, will go to a higher-level hospital just in case of childbirth complications. In our analyses, instead of a fine-grained complex taxonomy of illnesses, we adopt the widely-accepted dichotomy of acute and chronic illnesses, with the former taking place within four weeks preceding our survey, and the latter illness within 12 months of our survey. We analyze the choices among health care providers (private health care provider vs. CHC, and higher-level hospital/clinic vs. CHC) for acute and chronic illnesses.

In our statistical (regression) analyses, which aim to sort out the relative importance of different factors mentioned in in-depth interviews in shaping the choices among health care providers, we treat these factors as independent variables (see Appendix B). The results of regression analyses (see Table A1 in Appendix B) are summarized below:

- * Indicates a statistically significant impact of a particular independent variable on the choice among health care providers ("higher-level hospital vs. CHC" and "local private health care provider vs. CHC) for ***acute illness*** (* for one set of choice, and ** for both sets of choices).
- # indicates a statistically significant impact of a particular independent variable on the choice among health care providers for ***chronic illness*** (# for one set of choice, and ## for both sets of choice).
- Red color: odds ratio in favor of CHC
- Blue color: odds ratio in favor of another health care provider (either higher-level public hospital, or local private health care provider)

[22] A tablet of Vietnamese acetaminophen costs less than 1000 VND (less than 5 cents US).

1. Demography and Household Conditions

a. Gender: Higher odds that for both acute and chronic illnesses, males choose hospitals and local private health care providers over CHCs more than females do, but male-female differences in odds ratios are not statistically significant.
b. *##Ethnicity: statistically significant and higher odds that ethnic Vietnamese/Chinese choose local private providers over CHCs for acute illnesses, and that they choose both hospitals and private local providers over CHCs for chronic illnesses. In general, ethnic minority people rely more on CHCs than ethnic Vietnamese and ethnic Chinese.
c. *##Education: statistically significant and higher odds that for acute illnesses, more educated people choose hospitals over CHCs more than the less educated do, and for chronic illnesses, more educated people choose hospitals and local private providers over CHCs more than the less educated do. The less educated rely more on CHCs than the more educated.
d. **##Income: statistically significant and higher odds that people with more income choose hospitals and local private providers over CHCs for both acute and chronic illnesses. The poor rely on CHCs more than the non-poor.
e. **##Age: statistically significant and higher odds that for both acute and chronic illnesses, people in the 26-59 age range choose local private providers over CHCs more than the elderly (60 or more in age) do. Acute-illness patients in the 18-25 age range also choose local private providers over CHCs more frequently than the elderly. These differences reflect the fact that working-age people, facing greater time constraints than the elderly, choose local providers in their hamlets or villages for the sake of convenience. For the acute and chronic illnesses of young children (aged zero to five), there are statistically significant and higher odds that rural households choose both hospitals and local private providers over CHCs, reflecting people's high anxieties over the health of small children. In general, the elderly rely more on CHCs than many other age groups.
f. **##If a patient has no health insurance at all, the odds are in favor of a local private provider over a CHC, and a CHC over a hospital, for both acute and chronic illnesses.
g. **##Registration of health insurance policies by policy holders at CHCs increases the odds that they choose CHCs over hospitals and local private providers for both acute and chronic illnesses in 2013-14.

It should be added that the HI policies for children under six, the poor, ethnic minority people, retirees, and people contributing to the Vietnamese revolution had to be registered at CHCs. Voluntary HI purchasers could register at CHCs in their commune, at CHCs in a neighboring commune, or a district hospital. A number of people chose to register their health insurance at a neighboring commune's CHC or at a district hospital, especially if they lived closer to these facilities than to the CHC in their own communes.

Until 2016, in order to get full benefits, an HI policy holder was supposed to seek health care first at the place of HI registration. If an HI policy holder bypassed the

health care provider with whom they registered their HI, they normally had to pay 70% and HI covered only 30% of the costs. Even under this condition, as previously mentioned, many parents of sick children under six skipped CHCs despite the benefits and despite having to pay for medical services at local private providers or at hospitals.

However, the place of health insurance registration has declined in importance in the choice among health care providers, as the Vietnamese health insurance system allows HI policy holders free choice among health care providers (up to the district level starting in 2016, and to the provincial level starting in 2020).

2. *Local environment*
   a. **##More private health care providers in the commune mean statistically significant and higher odds that patients choose local private providers and hospitals over CHCs for both acute and chronic illnesses.
   b. **##A hamlet's location disadvantage to access its own CHC leads to statistically significant and higher odds that people in this hamlet choose hospitals and local private providers over CHC for both acute and chronic illnesses. (See Appendix B on how this index of a hamlet's location disadvantage is constructed.)

3 .CHC conditions and interventions
   a. A new or renovated CHC building leads to higher odds of patients' choices of CHCs over hospitals and local private providers for both acute and chronic illnesses, but the differences in odd ratios are not statistically significant.
   b. #Ultrasound machine in longer operation at CHC leads to statistically significant and higher odds that chronic illness patients choose CHCs over hospitals.
   c. MSI AP-funded: no statistically significant impact on the odds of patients' choices among health care providers for acute or chronic illnesses.
   d. *#MSI European-Union-funded: the lack of this program leads to statistically significant and higher odds that patients choose local private health care provider over CHCs for acute illnesses, and higher-level hospitals over CHCs for chronic illnesses (reasons for the difference in impact from AP-funded MSI program to be discussed below).
   e. **##Duration of Save the Children program at CHC leads to statistically significant and higher odds of a CHC being chosen over local private providers and hospitals for both acute and chronic illnesses.
   f. Having a physician on CHC staff: no statistically significant impact on the choice among health care providers for acute or chronic illnesses.
   g. #More medication for sale at CHC: leading curiously to statistically significant and higher odds that chronic-illness patients choose hospitals over CHCs.
   (In in-depth interviews, a number of chronic illness patients with HI policies, especially in the northern province of Thái Nguyên, complained of HI medication availability towards the end of the month. However, because the number of HI medication types has high correlation coefficients with both the CHC building score and the ultrasound machine score, using HI medication together with the last two variables may lead to statistical distortion).

4. Management and Leadership

h. *##Lack of time discipline among CHC staff: Curiously increasing the odds that CHCs are chosen over hospitals for both acute and chronic illnesses, and over local private providers for chronic illnesses. This may relate to the flexible time pattern prevalent in rural agricultural communities. The time discipline problem of CHC staff did not seem so bad in the context of overcrowded higher-level hospitals normally known for long queues and long waiting times. However, it remains an issue for further investigation why the lack of time discipline among CHC staff increased the odds of CHCs being chosen over hospitals for both acute and chronic illnesses, and over local private health care providers for chronic illnesses.

i. We have considered as an index of leadership the supplementary CHC income of CHC staff: From the case study team's report, the higher the supplementary CHC income to staff was, the less likely they engaged in private income-generating activities, and the more likely they showed a more positive attitude towards patients whose services provided them with additional income. However, this index has a statistically significant high correlation to quite a few other variables (ultrasound machine, MSI program, physician on staff, CHC medication on sale) and has to be removed from regression analyses in order to reduce possible statistical distortion. This factor is examined more carefully with a case study approach in the next section of the report.

In general, with the continuing trends of more private health care providers in a commune and beyond, improved transportation, continuously rising income levels, and more choices allowed by the health insurance system to HI policy holders, the patient flow to CHCs is unlikely to increase in the foreseeable future. However, our cross-sectional regression analyses confirm that CHCs remain an important health care provider for the disadvantaged (the poor, ethnic minority, the elderly, and the less educated) in the local population.

Among the interventions in CHCs to enhance thir capacity, some have a stronger impact than others. The duration of the Save the Children program had the clearest positive impact on patients' choices of CHCs over other health care providers for both acute and chronic illnesses. The Save the Children program (or another donor's similar program) seems to have a spillover effect onto patients' choices of CHCs. In contrast, the MSI program in reproductive health, which had the Sisterhood brand in two out of three communes, involved fee-paying services and products and had fewer clients than the Save the Children program. In-depth interviews reveal that many people in the two communes with the AP-funded MSI program did not know about it. Among those who knew it, it was praised by a number of interviewees for the quality of services while being criticized by others for charging for products and services that had been provided free. The AP-funded MSI program had no significant impact on patients' choices among health care providers. In contrast, the later EU-funded MSI program, which provided free services, was widely praised and led to statistically significant and higher odds of CHCs being chosen over local private providers for acute illnesses, and over higher-level hospitals for chronic illnesses. In TN1, the AP-funded MSI program was launched with a musical event for a number of prospective clients, with the hope that the information at this musical event about the program

would be spread further. In contrast, in VL3, the distribution of 1,300 free reproductive health vouchers by the EU-funded MSI program provided a strong incentive for people to try out the new high-quality services and to spread the information on the basis of patients' actual experiences about the program and about the CHC service standard in general. It is not surprising that the latter approach was more successful and that it had a spill-over effect on local people's choices among health care providers for chronic and acute illnesses.[23]

The ultrasound machine, both in itself and as an index of high-tech equipment at CHCs, also had a more limited impact than the CHC building or the Save the Children program: it significantly increased the odds of CHCs being chosen only over a higher-level hospital and only in the case of a chronic illness.[24] The ultrasound machine itself was mentioned as important in many in-depth interviews, but interviewees compared the 2D black-and-white ultrasound machine at CHCs unfavourably with the 3D ultrasound machine of other health care providers. However, the ultrasound machine as an index of CHCs' high-tech equipment in general (including diabetes-testing equipment or urine analyzers, and the electrocardiograph machine) can make a difference to patients with chronic illnesses like diabetes or with heart problems, many of whom are old and of limited mobility.

In in-depth interviews, people consistently mentioned a new or renovated CHC building as a positive development. While a new or renovated CHC building led to higher odds of CHCs being chosen over higher-level hospitals and private health care providers, the odds differences are not statistically significant.

In the larger picture, regression analyses indicate that the independent variables, including interventions in CHCs, explain only 28.3% (Nagelkerke square = .283) of the variablity of the choices among health care providers for acute illnesses, and 23.8% (Nagelkerke square = .238) of the variability of the choices among health care providers for chronic illnesses. Among the additional important factors is the leadership of CHC heads, which we examine in the next section using a case study approach.

4. CHC Management and Leadership

On the basis of case studies of 12 communes and CHCs, we have found that two CHCs (VL3 in Vĩnh Long and KH1 in Khánh Hòa) stood out in attracting patients, not only within the commune but also from surrounding areas (see Figure 10).[25] Benefiting significantly from AP investments, both also diversified their services to attract self-paying patients from afar, clearly

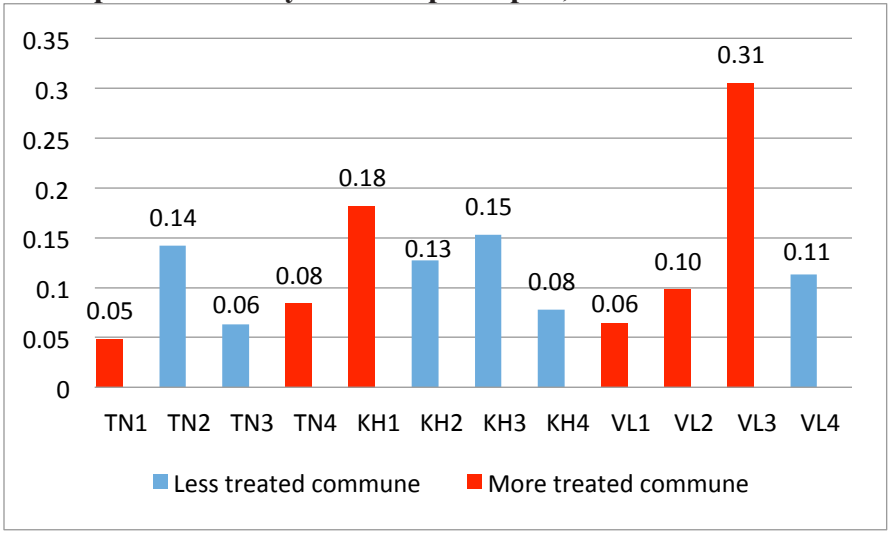
[23] The Department of Health in Vĩnh Long province chose 20 CHCs for the AP-funded MSI program and 20 other CHCs for the EU-funded one. The reputation of VL3 CHC played a role in its choice for MSI program funding. The statistically significant and higher odds of patients' choices of VL3 CHC for acute and chronic illnesses may reflect not only the impact of the EU-funded MSI program, but also the reputation of VL3 CHC in the local population.

[24] The number of years that ultrasound machines have been in operation at CHCs has a very high correlation (.86) with CHCs' high-tech equipment scores.

[25] The case study team reports on the basis of its participant observation at commune health centers and interviews with clients that TN1, TN3, and KH4 CHC inflated their client figures in order for their performances to look better with higher authorities. The team also reported that VL3 CHC deflated its figure in order not to attract the attention of higher authorities to its relatively high revenues from fee-paying services and to some informal arrangements without the approval of higher authorities.

adopted a client-centered approach to health care, had more centrally-pooled income, and strengthened their staff members' commitment to the CHC (see Lê Thanh Sang and Nguyễn Thị Nhung's report). This success resulted not only from investments in CHC infrastructure, equipment, and programs, but also from the leadership and management skills of CHC heads. For example, at the VL3 CHC, in 2006, the head broke the fence of government regulations on CHCs by forming a public-private partnership with a dental physician assistant (*y sĩ nha khoa*), who invested his own money in dental equipment and furniture and then offered dental services at the CHC.[26] (VL3 was the only one of the 12 studied CHCs with dental services.) When without patients, this contracted staff member also provided other services to the CHC, such as entering records of non-HI services and recording referrals to higher-level hospitals. VL3 CHC also went beyond selling medications at the CHC, and ran a thriving pharmacy located in front of the commune market and operated by a contracted CHC staff member.[27] These operations constituted parts of the VL3 CHC head's strategy to increase the range and quality of CHC services, as well as to enlarge the CHC's discretionary fund. This fund was also enlarged by popular services not covered by HI, such as ultrasound and acupuncture, as well as services to people without health insurance coverage.[28]

Figure 10. CHC's reported monthly caseload per capita, 2013-14



Source: Data of the Case Study Team from the 12 surveyed communes

At the VL3 CHC, the discretionary fund was used to:

a. hire four contracted workers (not counting the dental assistant) who were paid basic monthly salaries in order to ensure a smooth flow of services;

[26] Due to limited public investment funds, public-private partnerships have been authorized at central and provincial hospitals in order to enable public hospitals to compete more successfuly with private and international hospitals. With private investors' investments in new wings and equipment, some public hospitals can offer private rooms and quicker services for which patients have to pay. In Hồ Chí Minh City, public-private partnerships were also authorized on an experimental basis at ward CHCs in 2017 (Hà Phượng 2017, Nguyễn Thạnh 2017).

[27] The clients of the off-premise pharmacy were not counted as CHC's clients.

[28] VL3 CHC also attracted HI patients from some neighboring communes who registered their HI policies in VL3 partly because VL3 CHC could refer patients directly to the provincial hospital instead of the district hospital.

b. provide supplementary piece-rate payments to staff for the CHC's income-generating services;
c. provide supplementary income to all staff members; and
d. pay for office repairs and structural improvements at the CHC (such as a roof over the patients' waiting area).

When VL3 CHC hired an accountant on a contractual basis to do HI data entry, to settle the monthly balance sheets with HI, and to provide financial reports to higher authorities, this CHC solved recurrent problems about which other CHCs complained and for which they found no solution. The supplementary income from a centrally-pooled income fund motivated staff to become more dedicated to CHC services and not to conduct any sideline health care business of their own (as was done at most other CHCs under observation). Staff members readily assisted one another to ensure the smooth flow of services. Our case study team also observed VL3 CHC staff to be more courteous to patients, which in turn attracted more patients to the CHC. All of these improvements and the strong flow of patients to the CHC resulted partly from the leadership of the CHC head, who was willing to take risks and to break government regulation fences and able to distribute the workload and additional income fairly among the staff in order to ensure their dedication to the CHC. The head of VL3 CHC stated, "We have to know how to take care of our work, because if we waited for help, we would be sitting here until we died". This leadership at VL3 CHC, like that at KH1, succeeded in solving organizational, morale, and service quality problems that other CHCs faced. (See Lê Thanh Sang and Nguyễn Thị Nhung's report for a more in-depth discussion of VL3 and KH1 CHCs).

In 2016, the VL3 CHC's off-premise pharmacy had to close at the order of the provincial department of health on the basis of general CHC regulations. At the end of 2015, a health department's inspection team also required the former and innovative head of VL3 CHC to return 3,000 USD to the CHC fund for unauthorized renovation at the CHC (like a roof over outdoors benches for waiting patients, some renovation of rooms in CHC, and the construction of a small specialized room for sputum testing in the national TB program). Despite these setbacks, in 2016, VL3 CHC reported attracting more patients in the context of a new national policy allowing HI patients to seek care at any CHC or district hospital in their province. In contrast, during the case study team's revisit, CHCs in TN3 (less treated), TN4 (more treated), and VL4 (less treated) reported losing patients despite investments in physical infrastructure, equipment, and staff training. The greater-choice policy for HI patients led to greater differentiation among CHCs—even among more treated ones. To make good use of investments in CHCs, national and provincial authorities need to consider more flexible regulations, including allowing a public-private partnership at the CHC level, and to reward good management and leadership.

As suggested by Lê Thanh Sang and Nguyễn Thị Nhung (see attached report), while the Vietnamese Ministry of Health has embraced the idea of three CHC models, depending on proximity to major urban areas (2014 Decision No. 4667/QD-BYT), further differentiation among CHCs would be useful and some revision of national benchmarks for CHCs should be considered. For example, birth delivery, which Vietnamese health authorities consider an important part of standard CHC services, becomes less relevant except for remote and very poor communes. Money spent on birth delivery equipment and personnel at urban ward and rural lowland CHCs could be saved and shifted to remote CHCs in poor, mountainous areas where

people rely more on CHCs due to the presence of fewer private health care providers, more difficult transportation systems, and generally lower income levels (see attached report).

CONCLUSION

Rural CHCs play a vital part in the Vietnamese health care system since two-thirds of Vietnamese still live in the countryside. On a general level, investments in CHCs have led to positive changes in better antenatal care and better self-reported health. However, a lower percentage of patients in studied communes chose CHCs over time due to a wider range of health care providers, higher per capita income, and better roads and greater means of transportation. In this context, investments in CHCs at the more treated communes increased their ability to better serve disadvantaged members of the local population (the poor, ethnic minorities, the elderly, and women) and to contribute to reducing severe overcrowding at higher-level hospitals. A careful analysis of the significant variation in performance among CHCs with similar levels of investments suggests that leadership and management skills are as important as the investments in CHCs' physical infrastructure, high-tech equipment, and staff expertise. We suggest that national policies need to be more flexible regarding CHCs and pay greater attention to more differentiated models of CHCs for different parts of the country.

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APPENDIX A

Table A1. The differences between the two rounds in the percentage of pregnant women age 15-49 who had at least four antenatal care visits, by intervention in maternal and child health

	No Intervention (Not Treated)			Intervention (Treated)			DD (Treated - Not Treated)
	R1	R2	**R2-R1**	R1	R2	**R2-R1**	
Having 4+ antenatal check-ups	38.4	64.1	**25.7**	16.3	61.0	**43.7**	18.0

Source: Nguyễn Hữu Minh *et al.* 2017

APPENDIX B

REGRESSION ANALYSIS ON FACTORS INFLUENCING THE CHOICES AMONG HEALTH CARE PROVIDERS

From in-depth interviews, we consider as independent variables the following factors that appear to play a role in people's choices among health care providers.

1. Demography and household conditions: As revealed in in-depth interviews, we expect age, gender, wealth, ethnicity, education, and, among people with health insurance, the place of insurance registration to play a role in people's choices among health care providers. Some expectations include:

    - Gender: other things being equal, women with more domestic duties choose CHCs or a local health care provider more often than men.
    - Ethnicity: ethnic minorities, being generally poorer and having more state-subsidized health insurance, would use CHCs more than ethnic Vietnamese (also called "Kinh") and ethnic Chinese ("Hoa"), unless they registered their health insurance at the district hospital for their own convenience.
    - Education: more educated people with more income would use CHCs less than less educated people. Education is measured by the number of years necessary for educational attainment at a certain level (0 years for illiteracy, 12 years for completing high school, 15 years for completing college, 16 years for standard university graduates, etc.).
    - Household's per capita income: the richer people are, the more likely they can choose among health care providers, including those requiring out-of-pocket expenses, like private provides and higher-level hospitals.
    - Age: elderly patients are more dependent on other people for transportation and use CHCs and local health care providers more, while younger ones, especially with their motorcycles, are more mobile and have more choices.
    - Health insurance registration: Until 2016, in order to get full benefits, a HI policy holder was supposed to seek health care first at the place of HI registration (local CHC, CHC in neighboring commune, or district hospital). If a HI policy holder bypassed the health care provider with whom they registered their HI, they typically had to pay 70% and HI covered only 30% of the costs.

2. Local environment:
    - Number of private health care providers (both Western and Oriental medicine) in the commune: the more private health care providers there are, the more choices are available to patients, and other things being equal, the less likely the CHC is chosen.
    - A hamlet's location disadvantage to access its own CHC: Lê Thanh Sang and Nguyễn Thị Nhung (2017) have constructed a hamlet's location disadvantage index on the basis of three factors:
        - Distance from a patient's hamlet to the CHC: more than 3 kilometers or not.

- Condition of the road from a patient's hamlet to CHC: bad or not.
- The proximity of a patient's hamlet to other CHCs or higher-level hospitals: more than 3 kilometers or not.

The score of "0" (no disadvantage) is assigned if a hamlet is close to the CHC in its commune, with the road to the CHC in good condition, and is also far from the CHC of another commune or a higher-level hospital; "1" assigned with one of the three above factors present; "2" assigned with two of the three above factors present; and "3" assigned with all three factors present, meaning a high degree of a hamlet's disadvantage to access its own CHC. The lower the score is, the more likely people are to choose the CHC.

3. CHC conditions and interventions: In order to evaluate the effects of separate interventions, this analysis does not use the aggregate treatment scores of CHCs as seen in Table 1. From a statistical perspective, to the extent that these interventions might have both positive and negative impacts, aggregating them would render the overall impact weaker and possibly not statistically significant.[29]

- CHC building: score of 0, 0.5 or 1, as seen in Table 1.
- CHC's high-tech equipment: We use the number of years that a CHC had an ultrasound machine (0 to 2 years), instead of the high-tech equipment score for a CHC, for the following reasons:
  - The aggregate high-tech equipment scores for CHCs have a correlation coefficient of 0.78 with whether CHCs have a physician on staff or not (0 or 1). Under this condition, using both variables can cause statistical distortion in regression analyses.
  - The high-tech equipment score is thus replaced by the information about how many years a CHC had had an ultrasound machine (0 to 2 years). Of all the high-tech equipment, the ultrasound machine is used much more often than other types and is mentioned more often by patients than other high-tech equipment at CHCs.
- MSI program-AP funded: yes or no
- MSI program-European-Union-funded: yes or no (difference from AP-funded program discussed in the main text)
- Save the Children (SC) program or similar program by another donor: Number of years of program operation (0 to 4 years)
- Physician on staff: 0 or 1. Many interviewees talked about professional expertise at the CHC partly in terms of whether the CHC has a physician on staff. (The family doctor program is excluded from our quantitative analysis because of the all of the staff in the 12 CHCs, only one physician had received training in family medicine, and he did not fully practice family medicine at his CHC afterwards).

[29] Vũ Mạnh Lợi's regression analyses show that the aggregate categories of "more treated" vs. "less treated" or aggregate treatment scores do not have a statistically significant relation with people's choices of CHC (Vũ Mạnh Lợi 2017: 29).

- Medication availability: We use the number of medication types available for sale by CHC instead of the number of HI medication types, because the latter has high correlation coefficients with both the CHC building score and the ultrasound machine score, and using HI medication together with the last two variables may lead to statistical distortion.

4. Management and leadership: We consider two indices of CHC management and leadership, one important to patients and the other, to CHC staff:

- Staff's working-hour discipline: if a CHC had a fairly significant level of staff absenteeism, and if staff arrive late and leave early, this normally led to patients' complaints and going to the CHC less. The score in this case is 0. On the basis of the observation by the case study team, this score is assigned to four CHCs: TN1, TN3, KH2, KH4. If a CHC has low staff absenteeism and staff arrive and leave on time Monday through Friday, this CHC has a score of 1 (assigned to the remaining eight CHCs).
- Supplementary CHC income to CHC staff: this was a major incentive for staffs' strong commitment to CHCs, with a side effect on staff attitudes towards patients. From the case study team's report, the higher the supplementary CHC income to staff, the less likely they engaged in private income-generating activities and the more likely they showed a more positive attitude towards patients whose services provided them with additional income. The two mountainous CHCs in Khánh Hòa (KH3 and KH4) had no supplementary staff income from collective services at CHCs. Two CHCs, one in Vinh Long (VL3) and one in Khánh Hòa (KH1), provided significant additional income to staff from the expanded range of services at CHCs (to be further discussed). The eight other CHCs provided some additional income for staff from the CHCs' fee-paying services. However, this index has a statistically significant high correlation to quite a few other variables (ultrasound machine, MSI program, physician on staff, and CHC medication on sale) and has to be removed from regression analyses in order to reduce possible statistical distortion.

In Table A2, in columns 2, 4, 6 and 8 are odds ratios of a patient choosing a higher-level hospital vs. a CHC (column 2 for acute illness and column 6 for chronic illness), or a local private health care provider vs. a CHC (column 4 for acute illness and column 8 for chronic illness), while columns 3, 5, 7 and 9 include information on the levels of statistical significance (red means statistically significant). The baseline odds ratio is 1. It may change away from 1 with each increment in the independent variable: becoming less than 1 in favor of CHC and becoming more than 1 in favor of a higher-level hospital or private health care provider. The change in odds ratios can be large with a 2-value independent variable like ethnicity. For example, for acute illnesses, the odds ratio is slightly two times higher that ethnic Vietnamese/Chinese choose a local private health care provider over a CHC, in comparison to ethnic minorities (Table A2).

Table A2. Factors shaping choices among health care providers for acute and chronic illnesses

Independent Variables	Acute Illness				Chronic Illness			
	Higher-level Hospital vs. CHC		Local Private vs. CHC		Higher-level Hospital vs. CHC		Local Private vs. CHC	
	Odds ratio	Sig.	Odds ratio	Sig.	Odds ratio	Sig.	Odds ratio	Sig.
1. Demography and household conditions								
Gender								
• Male	1.377	.058	1.146	.256	1.137	.227	1.112	.269
• Female (baseline)								
Ethnicity:								
• Vietnamese/Chinese	1.556	.074	2.156	.000	1.694	.001	1.334	.045
• Minority (baseline)								
Education	1.048	.016	1.009	.483	1.047	.000	1.025	.007
Household income-per capita (million VND)	1.019	.002	1.020	.001	1.011	.009	1.011	.007
Age								
• 0-5	3.255	.005	1.794	.033	4.165	.000	2.625	.014
• 6-17	1.029	.934	1.367	.158	0.887	.572	1.109	.589
• 18-25	1.461	.432	2.261	.018	1.116	.699	1.082	.770
• 26-59	1.617	.132	1.910	.003	1.027	.836	1.467	.001
• 60 or more (baseline)								
Health insurance (HI)								
• No HI	0.409	.002	2.565	.000	0.601	.004	2.078	.000
• Registration at CHC	0.231	.000	0.469	.000	0.244	.000	0.347	.000
• Registration elsewhere (baseline)								
2. Local environment								
No. of private health care providers	1.092	.000	1.102	.000	1.033	.024	1.032	.016
Hamlet's Location Disadvantage	1.269	.035	1.312	.001	1.275	.000	1.381	.000
3. CHC conditions and interventions								
Building	0.603	.455	0.740	.535	0.754	.469	0.518	.078
High-tech equipment-Ultrasound-years	0.822	.327	1.033	.819	0.661	.000	0.855	.173
MSI program in reproductive health-AP								
• No	1.229	.469	1.411	.079	0.980	.912	0.755	.080
• Yes (baseline)								
MSI program in reproductive health-EU								
• No	2.905	.229	3.343	.048	6.523	.000	2.168	.095
• Yes (baseline)								
Save the Children program-years of operation	0.803	.006	0.818	.000	0.829	.000	0.880	.005
Having a physician on staff	0.530	.136	0.654	.180	0.748	.258	0.938	.795
No. of types of medication for sale	1.002	.697	1.000	.917	1.009	.001	1.103	.245
4. CHC management								
CHC staff-working hour discipline								
• No	0.396	.001	0.788	.262	0.281	.000	.629	.011
• Yes (baseline)								
N	1734				3148			
Nagelkerke square	0.283				0.238			