



Original article

## Financing Adolescent Health in China: How Much, Who Pays, and Where It Goes



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### A B S T R A C T

**Purpose:** Adolescent health has been gaining increasing attention in the Sustainable Development Goals era. Data on adolescent health financing are essential for evidence-based policy planning and evaluation. Little is known on national expenditure on adolescent health in China. To inform decision-making on national strategies of adolescent health and development, this study estimated expenditure on adolescent health-care utilization in China and identified funding sources and their allocation among different health functions.

**Methods:** We constructed and implemented an institutional survey and collected primary financial data from health institutions in the nine selected administrative provinces in 2014. We used the collected data to generate estimate of proportion of health spending on adolescent health and its breakdowns by health-care functions, health-care financing schemes, and diseases based on primary diagnosis. We applied the proportion estimates to the 2014 national-level health expenditure data and estimated national-level estimates of spending on adolescent health and breakdowns in aforementioned areas.

**Results:** Spending on adolescents health in 2014 amounted to CNY82.1 billion (USD 13.4 billion) or 2.6% of the total health expenditures in the year. Per adolescent health expenditures was CNY525 (USD 85.5), less than per capita health spending (CNY2349, USD382.4). National spending on adolescent health was 73.1% on curative care and 10.3% on preventive care. Out-of-pocket spending is the major source of adolescent health financing, contributing to 57.9% of total spending on adolescent health. Spending on respiratory, digestive, injury and poisoning, genitourinary diseases, and neoplasms accounted for 59.8% of curative care expenditures on adolescents.

**Conclusions:** Current financing mechanism on adolescent health stressed on curative care and imposed a large portion of financial burden on households. Future investment on adolescent

### IMPLICATIONS AND CONTRIBUTION

This study examines adolescent health financing in China for the first time using System of Health Account framework. The findings shed light on how to better prioritize health services for adolescents and allocate health funds across different services for adolescents more equitably and efficiently.

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health shall focus more on preventive care. Financing schemes shall be adjusted so as to reduce household out-of-pocket spending on medical care used by adolescents.

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Scientific evidence from multiple disciplines has shown that adolescent health and development lays foundation for lifelong health, economic productivity, and well-being and even impacts early life development of the next generation [1–4]. Unhealthy behaviors, such as substance use, physical inactivity, and sexual behaviors, initiated in adolescence were found to track strongly into adult life and increased the rates of morbidity and mortality [5,6]. With a rapidly increasing size in adolescent population, the importance of adolescent health for achieving the Sustainable Development Goals has been gaining global recognition [7,8]. As a result, adolescent health and development has been included in the Global Strategy for Women's, Children's and Adolescents' Health [9].

Investing in adolescent health could yield high economic gain, even without including the intergenerational benefits. It was projected that when investing USD 4.6 per capita per year in physical, mental, and sexual health between 2015 and 2030, the benefit-to-cost ratios could be more than 10.0 [2]. Recent studies discovered that adolescent health in developing countries has been undervalued in international development and received little attention from the international donors [10,11]. These studies called for a massive investment in adolescent health.

China has the second largest population of adolescents, with 145.7 million aged 10–19 years in 2016, accounting for 10.5% of its total population [12]. In 2016, the total number of deaths of adolescents was 27,919 and more than half of them were caused by traffic accidents, drowning, and cancers [13]. The number of newly reported sexual transmitted infections or HIV among adolescents aged over 15 years is increasing [14], and the incidence of unintentional pregnancy and abortion is growing among adolescents [15,16].

Healthy China 2030 Plan, the first national medium- and long-term strategic plan for population health, highlights the importance and need for the plan to intervene in adolescent health and development, especially in physical, and sexual and reproductive health (SRH) [17]. To prepare and inform decision-making on national strategies for adolescent health and development, it is necessary to know how much has been spent on adolescent health, where the money is from, and where the money goes. Without existing evidence, this study filled in the knowledge gap by quantifying investment in adolescent health in China at 2014 and assessing its pattern using primary data collected from health institutions in selected administrative provinces and secondary data obtained from the National Health Accounts (NHAs) or other sources.

## Methods

### Definition

In this study, adolescent health expenditure was defined as spending on health goods and services consumed to restore, maintain, and improve the health condition of the adolescents (10–19 years old) during one calendar year in China. We further classified the adolescent health expenditures by health-care functions and health-care financing schemes based on the

framework of System of Health Accounts 2011(SHA 2011) recommended by the World Health Organization [18].

In this study, health-care functions were classified into curative care, preventive care, ancillary services, medical goods, and health system governance, financing, and administration. Noteworthy, curative care included outpatient care, inpatient care, and rehabilitative care, as the existing data in China does not allow us to disaggregate rehabilitative care from curative care [18]. Health-care financing schemes in this study mainly refer to various mechanisms paying for received medical and health care, including public financing schemes (government schemes, and social health insurances), voluntary health-care payment schemes (voluntary health insurance, nonprofit institutions serving households [NPISH], and enterprise financing schemes), and household out-of-pocket (OOP) payments. The definition of specific health function and financing scheme is given in Appendix 1. In addition, we also classified the adolescent curative expenditure by disease or health condition based on primary diagnosis in line with International Classification of Diseases-10.

### Data

Adolescent health expenditure in this study covered the period from 1st January to 31st December 2014. Information was drawn from both the primary and secondary data. The NHAs in China provides information of annual national-level total health expenditure and its classifications by health-care functions and health-care financing schemes. The data, however, were at the aggregate level and could not be differentiated by age groups. To allocate the national expenditure to adolescent health, we designed survey instruments to collect data from various health institutions in nine selected provinces. We used the primary data to generate estimates of proportion of health spending on adolescent health. We then applied these estimates to the secondary data, national-level estimates, and obtained the adolescent health spending at the national level.

To collect primary health spending data, we constructed ad hoc institution surveys. Our survey instruments include questions on provision of preventive and curative services and their related costs in different health institutions (see questionnaire in the Appendix 2). Take hospitals, for example, regarding preventive care, we collected information via the questionnaire on earmarked funds (excluding staff salary) for prevention programs so as to determine payers' contribution (e.g., government schemes) to preventive care. To estimate the staff salary on preventive care, we collected the number of staff participating in preventive care delivery, their annual salaries, and their time allocated in preventive care so as to estimate monetary value of their devoted time. We also collected data on charges of receiving preventive care as well as payers for preventive services (e.g., health checkup, immunization). With these data, we were able to estimate how much funds were spent on preventive care and who paid for it. Regarding curative care, hospitals were requested to report individual outpatient and inpatient records, retrieved from the Hospital Information System (HIS) which provides information about services used, related costs, user's

age, gender, diagnosed diseases, length of hospitalization, type of payment (e.g., health insurance program or OOP), and reimbursements from health insurance programs.

The surveys were conducted in nine provinces. Using multi-stage sampling process, the nine provinces were selected from the 31 provinces in mainland China, considering their variations in geographic locations and economic development. Within each selected province, we selected one third of cities from three different income groups categorized by their per capita GDP: high-income, middle-income, and low-income. Within each selected city, we selected three counties or districts that had the strongest health information system in each income group based on the availability and quality of data that was reported in the previous year. The final sample includes 26 cities and 82 counties or districts in the nine provinces (see [Appendix 3](#)).

At each administrative level, the survey was conducted in various types of health institutions, involving general hospitals, Traditional Chinese Medicine hospitals, specialty hospitals, Maternal and Child Health Institutes, Center of Disease and Control, and other offices, such as independently established Health Education Institution and Health Supervision Institution.

There is usually only one entity for each type of health institutions in each administrative level, except for general hospitals. We selected half of them if multiple general hospitals exist. Moreover, at the district or county level, five primary health-care institutions (community health service centers or township hospitals) as well as around 50 providers of ambulatory care (e.g., community health service stations or village clinics) were selected. The total number of final surveyed institutions was 2,093, which included 461 hospitals, 310 community health service centers or township hospitals, 1,230 ambulatory care providers, and 92 preventive care providers.

## Estimations

To obtain national-level expenditure on adolescent health, we used top-down approach and estimated using two major steps. In the first step, we derived estimates from the collected primary data. In the second step, we applied the estimates obtained in the first step to the national-level health expenditure data. The underlying assumption of this practice is that the estimates derived from the selected nine provinces were representative at the national level. We provide a simple description for estimation as below (see [Appendix 4](#) for more details).

### I. Estimating health expenditure on adolescents by health functions

*Expenditure on curative care for adolescents.* Take hospital as an example to demonstrate how we derived spending on curative care for adolescents. Using the data retrieved from the HIS in sampled hospitals, we were able to generate (1) percentage of outpatient or inpatient spending in total curative care spending by adolescents and (2) percentage of spending on various diseases by adolescents using primary diagnosis information. Then, we applied these percentages to the national-level hospital spending data that were obtained from the National Health Accounts and Health and Family Planning Statistical Yearbook [19,20] to estimate national curative (or outpatient or inpatient) expenditure on adolescents as well as its breakdowns by specific diseases in all hospitals in China.

*Expenditure on preventive care for adolescents.* In China, preventive programs are often delivered free of charge or at a price which is much lower than their market cost. For each preventive program, we calculated both actual cost and received revenue for providing preventive care (e.g., user fees, government subsidy). As recommended by the SHA 2011, if a prevention program's (e.g. physical checkups) revenue was equal to or greater than 50% of spending on providing the care, its expenditure was set to equal to revenue or market price (i.e. the price at which they were actually sold). Otherwise, expenditure of the program was measured with its cost. Then, the spending of these programs on adolescents was calculated by the proportion of adolescents in total population or utilization which was determined by the contents of specific preventive programs.

*Expenditure on other health-care functions for adolescents.* National-level ancillary care spending, medical goods expenditure, and expenditure on health system governance, financing, and administration were available in the National Health Accounts and Health and Family Planning Statistical Yearbook [19,20]. However, because of data limitations, we were not able to disaggregate the spending by age groups for relevant health-care functions. We consulted domestic health account experts and made assumptions based on their recommendations. For example, expenditure on medical goods was decomposed by age groups borrowing the distribution of outpatient pharmaceutical expenditure by ages in the sampled general hospitals at all levels except at the provincial level, on account of medical goods sold in drug stores are quite different from those sold in provincial hospitals.

### II. Estimating health expenditure on adolescents by financing schemes

Using the collected primary data, we calculated the percentage of expenditure on adolescent health paid by each of the financing schemes. We obtained national-level payments by various financing scheme from the NHAs, Ministry of Finance, and Commission of Human Resource and Social Security. We applied the estimated proportion of payments for services used by adolescents in the nine selected provinces by each financing scheme to the national-level payments and obtained national-level payments by each financing scheme. Take social health insurances, for example. We used data of reimbursements for each service received by each patient documented in the HIS and obtained the share of its reimbursements going to services used by adolescents and by disease. Then, we applied this share to national-level social insurance to obtain social insurance payment for adolescent health.

Given that household OOP payments recorded by the HIS usually did not exclude the reimbursements from health insurance or government subsidies, household OOP payments for adolescent health were derived from subtracting all other financing schemes from the total current expenditure on adolescent health.

### Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publications.

## Results

### Total expenditure on adolescent health and its allocation by health-care functions

Table 1 presents data for health expenditures on adolescent health. In 2014, CNY82.1 billion (USD 13.4 billion) was spent on adolescent health in China, accounting for 2.6% of the total health expenditures in the year, or .1% of GDP. Per adolescent health expenditures were CNY525 (USD 85.5), less than per capita health spending (CNY2349, USD382.4).

The expenditure on various health-care functions is also shown in Table 1. Curative care represented the largest share of the total adolescent health expenditure (73.1%, with outpatient care: 38.7% and inpatient care: 34.4%) and consumed CNY 60 billion (USD 9.8 billion) in 2014. Preventive care (10.3%) and medical goods (9.8%) represented the second and third largest share of the total expenditure on adolescent health, followed by expenditure on governance and health system and financing administration (6.6%). The remaining .2% of the total expenditure was spent on ancillary services.

### Total adolescent health expenditure on curative care by disease

Table 2 shows percentage of curative spending on various diseases among adolescents. Approximately 60% of curative spending for adolescents was spent on respiratory diseases (22.8%), digestive diseases (14.1%), injury and poisoning (13.1%), genitourinary diseases (5.2%), and neoplasms (4.6%). The distribution of outpatient expenditure and inpatient expenditure by disease category varied. For outpatient care, the top five diseases with the largest expenditure were respiratory diseases, digestive diseases, injury and poisoning, dermatological diseases, and genitourinary diseases, constituting 64.5% of outpatient expenditure. For inpatient care, the top five diseases with the largest expenditure were injury and poisoning, respiratory diseases, digestive diseases, neoplasms, and infectious and parasitic diseases, accounting for a total of 59.9% of inpatient expenditure.

There was difference in adolescent curative expenditure between institutions by disease. In hospitals, it was mainly spent on injuries and poisoning (16.2%), respiratory diseases (15.4%), digestive diseases (12.9%), while neoplasms accounting for 6.0%. In primary health-care institutions, 47.2% of adolescent curative expenditure was used for respiratory diseases, 10.8% for digestive diseases, and 6.6% for injuries and poisoning. In providers of preventive care, curative expenditure was mainly used for pregnancy and childbirth complication (32.1%), respiratory diseases (14.9%), and infectious and parasitic diseases (13.2%). Moreover, inpatient and outpatient expenditure also showed different composition by diseases even in the same type of institutions. For example, in hospitals, the three most costly diseases were injury and poisoning (21.7%), respiratory disease (13.7%) and digestive disease (11.2%) for inpatient expenditure, while respiratory disease (17.8%), digestive disease (15.5%), and other not specified diseases (13.6%) for outpatient expenditure.

### Total expenditure on adolescent health by health financing scheme

Figure 1 shows the proportion of payments made by various payers. Household OOP payment was the largest component, accounting for 57.9% of the expenditure on adolescent health.

**Table 1**

Adolescent health expenditure and by health function in China, 2014

	CNY (billion)	USD (billion)	%
Adolescent health expenditure	82.1	13.4	100.0
Curative care	60.0	9.8	73.1
Outpatient care	31.8	5.2	38.7
Inpatient care	28.2	4.6	34.4
Medical goods	8.1	1.3	9.8
Ancillary services	0.1	0.0	0.2
Preventive care	8.5	1.4	10.3
Governance and health system and financing administration	5.4	0.9	6.6
As the share of total health expenditure	-	-	2.6
As the share of gross domestic product	-	-	0.1

Public financing contributed to 37.8% of the expenditure, of which, 19.7% came from government schemes and 18.1% from social health insurance. The remaining contribution was shared by voluntary health insurance schemes, enterprise financing schemes, and NPISH financing schemes, accounting for 2.1%, 2.0%, and .2%, respectively.

Table 3 shows who paid for various health-care functions. Household OOP payments contributed the highest percentage of payments for curative care (62.0%), followed by public financing (35.9, with 11.1% from government schemes, and 24.7% from social health insurance). For outpatient curative care, the OOP payments contributed to as high as 76.7% of the outpatient curative care expenditure. For inpatient curative care, public financing contributed to 50.3% of total inpatient care expenditure, followed by households (45.3%). This was also the case for medical goods. Expenditures on preventive care were borne mostly by government schemes (54.0%), followed by OOP payment (26.3%) and enterprise financing schemes (19.5%).

Table 4 shows the payers by disease for curative expenditure. For most diseases, household OOP payments were the major funding source, with exception of neoplasms and diseases of the blood and blood-forming organs. Household OOP payment took the highest percentage for dermatological diseases (72.9%), pregnancy and childbirth complication (70.2%), injury and poisoning (64.3%), mental illnesses (62.2%), and infectious and parasitic diseases (61.3%).

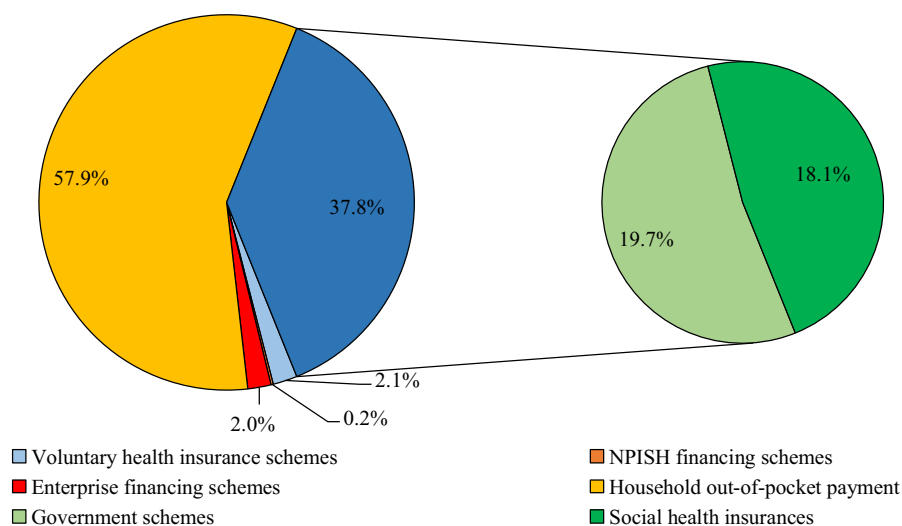
## Discussion

Using data collected from selected provinces and national health accounts, we estimated China's health expenditures on adolescent health in 2014 based on the SHA framework. Our study yielded two salient findings.

First, adolescent health expenditure accounted for a small portion of total health spending (2.4%), although adolescents constituted 10.9% of total population. Per capita adolescent health expenditure (CNY525, equivalent to USD84) was as low as one fifth of per capita total health spending. Second, we found that household bore the largest portion of financial burden for adolescents receiving health services (58%), especially for curative care (62.0%), or for dermatological diseases (72.9%), pregnancy and child birth complication (70.2%), and injury and poisoning (64.3%).

Several reasons may explain the relatively small portion of health spending on adolescent health and large financial burden





**Figure 1.** Composition of adolescent health expenditure by financing schemes, 2014. NPISH = non-profit institutions serving households.

borne by households. In terms of low spending on adolescents, the main reason is that adolescents generally are healthier than vulnerable populations (e.g., children and the elderly) and hence they have less health-care needs and consume relatively less health resources on average compared with other population. Besides, unmet medical need or utilization of unqualified medical care may exist among adolescents especially in mental health and SRH. By some estimates, more than 30 million children and adolescents under 17 have behavioral and emotional problems in China, among which about 50%–70% need mental health services but remain untreated [21]. As to SRH, a study found that around 60% of the surveyed adolescents who were in need of consultation services for reproductive health care, sexual psychology and contraceptive knowledge and skills, did not get these services [22]. Over 50% of the demands among adolescents for treating diseases such as menstrual problems, reproductive tract infections, and genital abnormalities had not been realized [22]. Because of the fear of being judged and discriminated against, 39% of unintentional pregnant youth resorted to private clinics for abortion services rather than public hospitals which provide more qualified services [23]. Private clinics in China are usually low-cost, privacy-protected clinics, yet with poor quality and safety issues [22]. Costs of going to private clinics for abortion or other services were not captured by this study and could lead to underestimation of adolescent health spending.

In terms of heavy financial burden on households, it can be explained by relatively low compensation rate of two main insurance programs offered to adolescents in China: Urban Resident Basic Medical Insurance and new Rural Cooperative Medical Scheme. According to insurance policies, except for catastrophic diseases, outpatient care is not typically a priority of the two health insurances and hence diseases such as dermatological diseases which mostly require outpatient care are more costly to households. In comparison, diseases that require inpatient care and are covered by health insurances tend to cost households less (e.g. neoplasms). In this study, only 13% of outpatient care expenditure was financed by health insurances, while it was 38% for inpatient care expenditure. The level of reimbursement for inpatient care for adolescent is lower than the average level for

all population [24,25]. Secondly, some diseases or conditions (such as traffic accident or intentional injury, etc.) may not be covered by social health insurance. For pregnancy and childbirth complication, usually the expenditures incurred cannot get reimbursement from Urban Resident Basic Medical Insurance or new Rural Cooperative Medical Scheme or parents forgo the compensation so as to keep the secret for fear of stigma.

High OOP payments can create a significant barrier to accessing care, leading to individual's delaying seeking care or going for cheaper alternatives, which can further increase health expenditures in the long-run [26]. High OOP payments can also result in catastrophic financial payments or even impoverishment [27]. It is estimated that among underprivileged households, 44.1% were impoverished because of illness in China [28]. Protecting people from medical financial risk is a priority of Chinese governments. To monitor the level of health financial risk protection and evaluate whether further measures need to be taken, the Healthy China 2030 Plan has set targets to reduce the percentage of OOP payment in total health expenditure to 28% by 2020 and to 25% by 2030 [17]. While the share of catastrophic expenditures of adolescents cannot be obtained from our results, the results do imply that OOP payments for adolescent health are relatively high and thus protecting households, particularly the most vulnerable ones, requires further attention.

In addition, this study found that the health resource among health functions may not be allocated in a most efficient way. Adolescent health funds had been concentrated on curative care rather than preventive care or primary care which is highly cost-effective. It showed only about 27% of adolescent health expenditure had been used for preventive care and primary care. Most of health resourced had been consumed in hospitals. The findings are hardly surprising due to the fact that the health-care system in China is largely a hospital-based and disease-centered delivery system [29]. Most beneficiaries of social health insurances are more willing to seek medical care at higher levels of hospitals [30].

The existing distribution of health resources among adolescents in China as described in this study may not represent the most efficient approach or provide the greatest value, given that

**Table 3**  
Financing of adolescent health expenditure by health function, 2014

	Public financing (%)	(1) Government schemes (%)	(2) Social health insurance (%)	Voluntary health care payment (%)	(1) voluntary health insurance (%)	(2) NPISH financing schemes (%)	(3) enterprise financing schemes (%)	Household out-of-pocket payment (%)	Total (%)
Curative care	35.9	11.1	24.7	2.2	1.9	0.2	0.0	62.0	100.0
Outpatient care	23.1	10.1	13.0	0.2	0.0	0.2	0.0	76.7	100.0
Inpatient care	50.3	12.3	38.0	4.4	4.1	0.3	0.0	45.3	100.0
Medical goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
Ancillary services	73.0	73.0	0.0	0.0	0.0	0.0	0.0	27.0	100.0
Preventive care	54.1	54.1	0.0	19.5	0.0	0.0	19.5	26.3	100.0
Governance and health system and financing administration	88.9	88.9	0.0	11.1	11.1	0.0	0.0	0.0	100.0
Total	37.8	19.7	18.1	4.3	2.1	0.2	2.0	57.9	100.0

NPISH = nonprofit institutions serving households.

**Table 4**  
Financing of adolescent curative expenditure by disease category, 2014

	Public financing (%)	(1) Govern-ment schemes (%)	(2) Social health insurances (%)	Voluntary health-care payment schemes (%)	(1) voluntary health insurance schemes (%)	(2) NPISH financing schemes (%)	Household out-of-pocket payment (%)	Total (%)
Infectious and parasitic disease	36.7	10.5	26.2	2.0	1.8	0.2	61.3	100.0
Neoplasms	56.1	5.7	50.5	6.3	6.0	0.3	37.6	100.0
Diseases of the blood and blood-forming organs	49.3	7.2	42.1	3.5	3.2	0.3	47.2	100.0
Endocrine	44.3	4.9	39.4	2.0	1.7	0.3	53.7	100.0
Mental illness	36.4	15.0	21.4	1.4	1.3	0.1	62.2	100.0
Nervous system	43.8	8.3	35.5	3.3	3.0	0.3	52.9	100.0
Disease of the eye and adnexa	45.6	8.8	36.7	1.4	1.1	0.3	53.0	100.0
Diseases of the ear and mastoid process	39.2	9.6	29.7	2.8	2.5	0.3	58.0	100.0
Circulatory system	42.8	8.9	33.9	3.1	2.8	0.3	54.1	100.0
Respiratory system	34.9	13.9	21.1	1.1	0.9	0.2	64.0	100.0
Digestive system	34.6	7.7	26.9	1.5	1.3	0.2	64.0	100.0
Dermatological	26.0	8.5	17.5	1.1	0.8	0.3	72.9	100.0
Musculoskeletal	34.2	7.8	26.4	3.1	2.8	0.2	62.8	100.0
Genitourinary system	36.2	7.4	28.8	1.9	1.7	0.3	61.9	100.0
Pregnancy and childbirth complication	27.9	10.9	17.0	1.9	1.6	0.3	70.2	100.0
Congenital malformations	31.9	3.9	27.9	3.7	3.3	0.4	64.5	100.0
Injury and poisoning	32.5	7.1	25.4	3.1	2.8	0.3	64.3	100.0
Other not specified diseases	32.5	10.2	22.3	1.8	1.5	0.3	65.7	100.0

NPISH = nonprofit institutions serving households.



most health problems on adolescents, such as reproductive diseases, obesity, alcohol use, and so forth, are preventable, and many interventions are cost-effective, which has been proved by many studies [31]. According to our findings, over half of curative expenditures had been spent on respiratory diseases, digestive diseases, genitourinary diseases, as well as on injuries and poisoning, which could be avoided if quality prevention and primary care were provided. Another issue that hampered the prevention of adolescents is insufficient public fund for preventive programs. This undoubtedly dampens the willingness on the part of institutions to provide preventive services and on the other hand hampers the access to preventive services for adolescents.

The findings in this study have some limitations. First, allocating spending by disease was based on primary diagnosis, and this could be problematic when comorbidity exists [18]. It may underestimate the expenditure on some of these secondary or underlying diseases and conditions. To allocate expenditures across the applicable diagnose using disease-specific weights that reflect the relative resource intensity would be the most ideal; however, data were not available for that type of exercise. Second, national-level spending on adolescent health was based on estimates generated from the data collected from nine provinces. Although this practice has been adopted by existing programs [32], it is reasonable to raise concerns about national representativeness of the primary data given quite socioeconomic disparities across provinces in China. Moreover, in the selected provinces, we only included those counties or districts with better information system. This practice could also potentially introduce bias in estimation. Third, due to lack of existing evidence, our ability of correctly classifying fund for some financing schemes (e.g. enterprise financing schemes and NPISH financing schemes) or functions (e.g. ancillary services, governance and health system, and financing administration) was limited. We had to make assumptions based on opinions of medical experts, which could not be validated at this stage. We hope that these limitations could be addressed in future when we gather more experience from this practice and obtain more investments in data collection.

Despite these limitations, this study is the first exercise that provided a picture of the financial flows of adolescent health in China in terms of how much has been spent, by whom, and on which services. To our knowledge, this is the first study which, based on the SHA 2011 framework, developed data collection and estimation tools for assessing domestic spending on adolescent health in low- or middle-income countries, and the method could be adopted by other countries. Information generated from the study has important policy implications for policymakers in China and shed light on how to better prioritize health services for adolescents and allocate health funds across different services for adolescents more equitably and efficiently.

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## Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jadohealth.2020.03.033>.

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