

UP CIDS DISCUSSION PAPER 2019-02

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**Program on
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Eliminating the deficit in medical doctors: Strategies and costs

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ABSTRACT

Although there is no consensus on the precise figures, there is wide agreement that there is a severe deficit in the number of practicing medical doctors in the Philippines relative to the accepted standard of 1.1 doctors per 1,000 population. There is a huge, though difficult to quantify, cost in terms of poorer health outcomes for Filipinos as a result of prolonging this deficit. In this paper, we estimate the number of additional doctors and, consequently, medical students needed to eliminate the deficit under different timelines. We then computed the monetary costs of supporting such additional medical students in medical schools under three types of support: (1) tuition and fees only; (2) school fees including living expenses; and (3) medical education plus undergraduate support. Finally, the paper puts forward recommendations on how to begin operationalizing such scholarship programs and on specific topics for further research in support of such programs.

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KEYWORDS

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The severe shortage of practicing medical doctors

While there is wide agreement that there is a severe deficit in practicing medical doctors in the country, there are many different estimates of the exact shortfall. It is challenging to arrive at precise estimates because of the lack of complete data both on the supply side and the demand side. Estimates range from a 40,000- to 100,000-doctor shortfall in practicing doctors, without regard, at this point, to specializations and geographic location of practice.

In the Department of Health (DOH)’s *Human Resources for Health Strategy for the Philippines: 2014-2030* (2013), there are several databases cited as sources of information to approximate the stock of doctors in the country, although none of them coincide. The main source is the National Database on Human Resources for Health Information System (NDHRHIS), which in 2017 counted 37,000 doctors. As a complementary DOH database, the Field Health Service Information System (FHSIS) reports the number of doctors based on local reports and estimated around 2,648 at local government levels in 2010. As a third possible source information, one can use data from the Philippines Statistics Authority (PSA), which for 2017 reported about 54,000 doctors. Finally, the World Health Organization (WHO) uses the Pharmaceutical and Health Care Association of the Philippines (PHAP) Factbook to mention that in 2008, the country had 45,555 doctors (Romualdez et al. 2011).

In addition, to have a better sense of the flow of doctors going into the labor market, information on college graduates provided by the Commission on Higher Education (CHED), and on licensed professionals provided by the Professional Regulation Commission (PRC) can be used. Moreover, information from the Philippine Overseas Employment Administration (POEA) and the Commission

on Filipinos Overseas (CFO) are also useful in looking into the number of doctors emigrating temporarily and permanently.

This paper does not seek to arrive at a precise estimate, but rather, propose possible strategic mechanisms for filling these gaps at the national level within a period of 15 to 20 years. For the purpose of illustrating the costs of these strategies, we use the estimate of the DOH that there is a deficit of around 70,000 medical doctors (*see* Table 1 below) in 2017. However, these deficits are not evenly distributed across regions. Regions IV-A, III, and VI all have the sharpest deficits. Specifically, using the standard target of 1.1 doctors per 1,000 population, the estimated number of medical doctors needed for the 2017 population is 114,934. According to the DOH, there are 40,775

TABLE 1 Estimated number of medical doctors, targets, and deficits by region, 2017

Region	Population	Public MDs	Private MDs	Total MDs	MD-to-population ratio	Deficit MDs
I	5,131,783	1,158	905	2,063	0.40	3,582
II	3,528,825	712	488	1,200	0.34	2,682
III	11,688,701	1,924	2,235	4,159	0.36	8,699
IV-A	15,572,558	1,172	3,044	4,216	0.27	12,914
IV-B	3,096,193	453	132	585	0.19	2,821
V	5,955,228	914	570	1,484	0.25	5,067
VI	7,740,311	1,164	1,241	2,405	0.31	6,109
VII	7,643,521	1,335	1,039	2,374	0.31	6,034
VIII	4,448,410	787	402	1,189	0.27	3,704
IX	3,853,217	636	349	985	0.26	3,254
X	4,923,446	778	618	1,396	0.28	4,020
XI	5,089,893	456	1,072	1,528	0.30	4,071
XII	4,857,191	558	516	1,074	0.22	4,269
ARMM	3,588,449	334	14	348	0.10	3,599
CAR	1,808,623	794	339	1,133	0.63	856
CARAGA	1,808,623	447	129	576	0.32	1,413
NCR	13,321,549	6,592	7,468	14,060	1.06	594
TOTAL	104,056,521	20,214	20,561	40,775	0.39	73,687

Source: Data collated from submissions to DOH-HHRDB

doctors currently practicing in medical facilities, and the deficit at the national level is at 73,687.

Creating different cost and time-horizon scenarios in filling these deficits requires an understanding of the supply-side constraints, the expansion of the demand for doctors, and the typical costs of supporting medical school training. Each of these are discussed in this paper.

Time horizon of medical school training and expansion of practicing doctors

The education cycle for medical doctors is comprised of four (4) years of undergraduate education, five (5) years of medical school coursework, and one (1) year of internship before they are qualified to take the licensure (medical board) exam. Passing the medical board exam qualifies one to practice as a general practitioner, and most new doctors will enter a residency program as training toward a specialization. All in all, this means that from senior high school, it takes an additional nine to ten years of training toward being a doctor, from undergraduate studies to the licensure exam. Accelerated programs such as the University of the Philippines (UP)'s Integrated Liberal Arts and Medicine (INTARMED) program shortens this to seven years, incorporating undergraduate education with medical training. However, the INTARMED program only accepts forty (40) students a year and selects the best-performing students under the assumption that the accelerated version of medical school is much more demanding.

Assuming a medical training program of five years, combined with population growth as projected by the PSA, Table 2 (on page 5) illustrates the projected number of new medical doctors needed per year to meet and maintain the recommended target of 1.1 doctors per 1,000 population, given different time horizons. The regular entry and exit of medical doctors at the current rates are assumed in the table. To meet the deficit by year 2028, assuming that any intervention will start in 2019, there must be 15,765 new doctors entering the system

TABLE 2 Number of new medical doctors needed each year starting 2024 to meet the deficit

Year	Projected population*	Projected number of medical doctors**	Zero deficit by 2028	Zero deficit by 2033	Zero deficit by 2038	Zero deficit by 2043
2018	106,282,216	42,856				
2019	108,110,270	45,106				
2020	109,947,900	47,526				
2021	111,550,200	50,115				
2022	113,152,500	52,873				
2023	114,754,800	55,800				
2024	116,357,100	58,897	15,765	8,640	6,201	4,925
2025	117,959,400		15,765	8,640	6,201	4,925
2026	119,435,020		15,765	8,640	6,201	4,925
2027	120,910,640		15,765	8,640	6,201	4,925
2028	122,386,260		15,765	8,640	6,201	4,925
2029	123,861,880			8,640	6,201	4,925
2030	125,337,500			8,640	6,201	4,925
2031	126,650,780			8,640	6,201	4,925
2032	127,964,060			8,640	6,201	4,925
2033	129,277,340			8,640	6,201	4,925
2034	130,590,620				6,201	4,925
2035	131,903,900				6,201	4,925
2036	133,029,560				6,201	4,925
2037	134,155,220				6,201	4,925
2038	135,280,880				6,201	4,925
2039	136,406,540					4,925
2040	137,532,200					4,925
2041	138,444,780					4,925
2042	139,357,360					4,925
2043	140,269,940					4,925

* Future population starting 2020 and every 5 years thereafter from PSA, values in-between were interpolated

** Increase in enrollment assumed at 2,000 per year starting in 2017 and that the number of graduates is 20% of total enrollment; graduates are assumed to be 90% of cohort who entered medical school and that passing rate in the board exam is 75%; a further assumption is that net number of new additional doctors is only 56.5% of board passers because of migration, retirement, death, and no practice

each year from 2024 to 2028. Following the same logic, if the target year is 2033, the number of new doctors should be around 8,640 per year for a period of ten years. If the target year is 2038, it is 6,201 per year, and if it is 2043, 4,925 new doctors will be needed annually.

Medical schools do not produce enough graduates

The main constraints to filling these gaps in the next 15 to 20 years come from the supply side. As for the last five years, all medical schools across the country only graduated an average of about 3,000 students annually. This has been steadily but slowly increasing, from 2,453 in Academic Year (AY) 2011–2012 to a high of 4,165 in AY 2015–2016. About 80% of these graduates will eventually pass the medical board exam. However, further attrition is expected between passing the boards and practicing as a doctor in the country. A significant portion of qualified doctors will leave for overseas work or will decide not to practice. These sources of constraints are factors in the deficit of doctors which should be systematically examined.

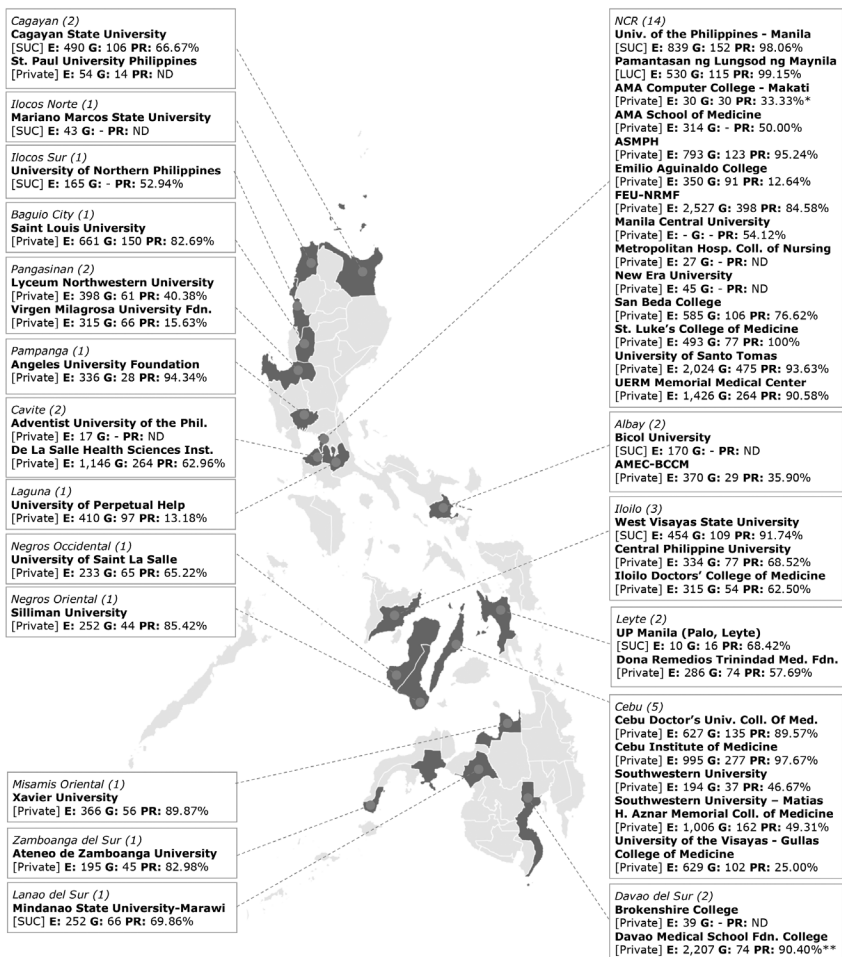
As of writing, there are forty-four (44) recognized medical schools in the country: eight (8) in state universities and colleges (SUCs, including UP), one (1) in a local university, and 35 in private higher education institutions (HEIs). Fourteen (14) of these programs are located in NCR, and only five (5) in the whole of Mindanao (*see* Table 5 on page 9). The reported total number of graduates in AY 2015–2016 was 4,165, the highest in the last five years (*see* Table 4 on page 8). A vast majority of graduates come from private schools: in AY 2015–2016, 86% graduated from private schools, lower than the previous year's peak at 90%. The largest programs in terms of number of graduates are in private schools, namely the University of Santo Tomas (475 in 2016), Far Eastern University (398), and Cebu Institute of Medicine (277) (*see* Appendix B on page 24).

The regional distribution shows a heavy reliance on NCR-based medical schools, where 44% of all graduates come from, followed by Region VII (mainly schools in Cebu) with 18%. The rest of the country only have fewer than five (5) schools so their share of graduates is

much smaller, with the smallest shares of graduates coming from Regions III, IX, V, and X.

These numbers highlight two critical constraints in expanding the pool of doctors in the country. First, the output of medical schools is

MAP 1 Medical schools in the Philippines



Legend:

E: number of enrollees for AY 2016/17 (across all years)

G: number of graduates for AY 2015/16

PR: Professional Regulation Commission Passing Percentage in Physician Licensure Examination 2016

*passing rate for 2010

**passing rate for 2015

TABLE 3 Enrollees (actual and projected) in medical schools by institution type, 2012–2022

Academic year	Overall number of enrollees	Enrollees in public medical schools	Enrollees in private medical schools
2012–2013	15,820	2,214	13,606
2013–2014	17,612	1,555	16,057
2014–2015	18,407	1,649	16,758
2015–2016	21,428	1,709	19,719
2016–2017	22,952	2,953	19,999
2017–2018	25,286	2,727	22,987
2018–2019	26,631	2,924	23,760
2019–2020	29,037	3,121	26,401
2020–2021	30,382	3,319	27,175
2021–2022	32,787	3,516	29,816

Note(s): Values in italics are projections derived from CHED data from 2012 to 2016

TABLE 4 Graduates (actual and projected) of medical schools by institution type, 2011–2021

Academic year	Overall number of graduates	Graduates from public medical schools	Graduates from private medical schools
2011–2012	2,453	437	2,016
2012–2013	2,577	314	2,263
2013–2014	2,829	297	2,532
2014–2015	3,351	323	3,028
2015–2016	4,165	564	3,601
2016–2017	4,435	512	3,923
2017–2018	4,872	546	4,326
2018–2019	5,309	580	4,730
2019–2020	5,746	613	5,133
2020–2021	6,183	647	5,536

Note(s): Values in italics are projections derived from CHED data from 2011 to 2015

very small and has remained small in relation to the growing demand for doctors. Even before accounting for attrition resulting from board exam results and migration, either medical schools are not producing enough doctors, or there are simply not enough medical schools.

TABLE 5 Number of graduates and enrollees in medical schools per region

Region	Number of HEIs	Enrollment (AY 2016–2017)	Graduates (AY 2015–2016)
ARMM	1	1%	2%
CAR	1	3%	4%
I	4	4%	3%
II	2	2%	3%
III	1	1%	1%
IV	3	7%	9%
IX	1	1%	1%
NCR	14	43%	44%
V	2	2%	1%
VI	4	6%	7%
VII	6	16%	18%
VIII	2	1%	2%
X	1	2%	1%
XI	2	10%	5%
GRAND TOTAL	44	100%	100%

Source: CHED data (as of 2017) based on submissions of higher education institutions

Second, the low output of public medical schools, which are among the high performers in terms of passing rates in board exams, has important implications on any proposal to support scholarships using public funds. In the most recent year, only 564 students graduated from public medical schools.

Expanding access to medical school

Why are there not enough medical students? One possibility is that there are enough medical programs, but many of the programs are operating under capacity. There might be too few applicants to medical schools, or enrollee intake may be high but attrition throughout the program is also high. The former is the more likely explanation. Medical education is expensive, ranging from a low of Php 44,000 per year in the most heavily subsidized public university to a high of

around Php 300,000 in a private one. If the average tuition and other fees cost about Php 200,000 per year, across six years of medical school, and assuming a living expense of another Php 100,000 per year, it will take about Php 1.8 million to put a student through medical school (not including opportunity costs). An idea of these direct costs will discourage families to enroll their children in medical schools. It will take a medical graduate six years of employment before he/she can recover his/her expenses and opportunity costs for getting his medical education if he works as a doctor in a DOH (public) hospital.⁶ A large pool of available comprehensive scholarship support can attract many deserving young people into the profession.

The second scenario is that there are not enough programs or not enough slots in the existing programs. If the demand for these programs and capacity to pay of prospective enrollees are both high, private school programs, in theory, would multiply without intervention. Medical programs in public universities have not expanded significantly in decades and are certainly not at par with the rate of growth of the demand for doctors. Top-performing programs like those in UP Manila, West Visayas State University, Pamantasan ng Lungsod ng Maynila (PLM), and Mindanao State University–Marawi have fewer than 170 students graduating per year. As most programs are old programs in very established HEIs, why has there not been efforts to expand student capacity? UP Manila, for example, has not increased its student body in years, even though funding for its teaching hospital has increased.

It is very likely that both scenarios explain the deficit. Existing programs have room to significantly expand their student body, especially the public schools, and there is room in the market for additional programs if the potential students have the capacity to pay the high relative costs of medical education. From the perspective of the DOH whose objective is to catalyze a high level of growth in the

⁶ This assumes, not considering inflation, expenses of Php 200,000 and foregone salaries of Php 240,000 per year for six (6) years, salary of Php 68,000 per month for the first three years of employment, and Php 78,000 per month for the next three years of employment, and a real interest rate of 3%.

number of practicing doctors in the country as quickly as possible, the objective should be to add to the total number of graduates above the regular output of medical schools today. This will require large and sustained investments in direct scholarships for medical students in both private and public programs and in expanding the capacity of public medical programs. It could likewise encourage medical schools to shorten the length of their programs.

In sum, the main constraints are that there are not enough slots in medical schools in the country, that the majority of existing programs are expensive, and that the medical education program takes an additional six years after graduating from college to complete.

How long would it take and how much would it cost?

This section presents some cost and timeline projections for achieving a 1.1:1000 doctor-to-population ratio in the country, mainly through scholarships. It will take 24 years, or by 2042, at current trends, before the country can attain the ideal doctor-to-population ratio of 1.1:1,000. This is likewise under the assumption that recent trends in medical enrollment, graduation, PRC exam passing rates, and exit from service (whether due to migration, retirement, or death) will continue. We then computed the additional number of students (and the associated costs) that need to be enrolled to achieve the 1.1:1000 doctor-to-population ratio within a given target period. For projected costs, the budget scenarios reflect support for all students via scholarships per year, based on a target of 10 years (to 2029), 15 years (to 2034), and 20 years (to 2039) in achieving the target of zero doctor deficit. The base year used is 2019, the assumed beginning year of providing financial support to the additional medical students. The tables use a flat indicative cost of medical school tuition and miscellaneous fees of PhP 200,000 per year. Budget requirement scenarios have options for (1) support for medical school tuition and fees, (2) an additional stipend of 100,000 per year living allowance, and (3) an additional support of 40,000 per year for four years if scholars are funded for their undergraduate pre-medicine degrees as well.

Zero deficit by 2028

If the target is to fill all deficits by 2028, the target number of new medical students should be 20,013 annually from 2019 to 2023, resulting to an additional 13,058 new doctors each year from 2024 to 2028 (see Table 6 on page 13). Financial support for this scenario will amount to Php 4.003 billion for 2019, adding the same amount each year thereafter for new students and peaking in 2023 when the total support amounts to close to Php 20.013 billion per year to support 100,063 students. The annual support will start declining from that year, as the first batch of students have already graduated, until the deficit is filled in 2028 and no more scholars are supported. The total cost throughout the period is around Php 100 billion if support is only for medical school tuition and fees, Php 150 billion if support will include living allowances, and Php 182 billion if it includes support for undergraduate degrees.

Across all scenarios, the longest timeline has the lowest overall cost for a large program to eliminate the deficit. However, with a shorter timeline, the largest constraint is the carrying capacity of medical schools. School-level engagements and interventions will be needed to expand slots in existing programs. Novel approaches can be designed to make this expansion temporary, such as multi-year agreements with medical schools to make accommodations in order to double their student body. A careful study of the expansion capacity of SUCs is warranted, given their small program sizes and strategic locations.

Zero deficit by 2033

If the target is to fill all deficits by 2033, the number of additional medical students should be 8,835 per year from 2019 to 2028, which will result in having 5,964 new doctors annually from 2024 to 2033 (see Table 7 on page 14). Funding for this scenario will start at Php 1.767 billion in 2019 and will peak in 2023 when total support amounts to close to Php 8.835 Billion per year to support 44,177 scholars until 2028. The annual support will start to decrease from that year, until the deficit is filled in 2033. The total cost throughout the period is

TABLE 6 Target to zero deficit year 2028

Year	Target number of additional new doctors apart from trend addition to meet standard	Target number of additional medical students at given rate of completion and PRC passing rate for scholarship support	Total number of additional medical students supported by scholarship	Cost of scholarships (no adjustment for inflation yet)		
				(A)	(B)	
				Medical school tuition and other fees (in Php million)	(A) + Allowance of Php 100k/year (in Php million)	(B) + Undergrad support for 4 years of Php 40k/year (in Php million)
2018						
2019		20,013	20,013	4,003	6,004	12,556
2020		20,013	40,025	8,005	12,008	18,495
2021		20,013	60,038	12,008	18,011	24,418
2022		20,013	80,050	16,010	24,015	30,342
2023		20,013	100,063	20,013	30,019	36,265
2024	13,508		80,050	16,010	24,015	24,015
2025	13,508		60,038	12,008	18,011	18,011
2026	13,508		40,025	8,005	12,008	12,008
2027	13,508		20,013	4,003	6,004	6,004
2028	13,508					
2029						
TOTAL				100,063	150,094	182,114

* 100% of additional students supported by scholarship for 6-year program

** Cost of medical school tuition and miscellaneous Php 200,000 per year

Php 88.3 billion for tuition and miscellaneous fees, Php 133 billion if support will include living allowances, and Php 161 billion if it will include support for undergraduate degrees.

With a longer timeline, medical schools will only need a smaller rate of expansion to accommodate the target number of new students and graduates. This rate of expansion will not require special measures in terms of direct engagement with medical schools, as it can be achieved by simply providing full scholarships. The total cost to produce all the new doctors needed is lower, with the annual

budget to support medical school fees not going over Php 8.8 billion per year. However, there will be obviously a huge though difficult-to-quantify cost in terms of poorer health outcomes for Filipinos as a result of prolonging the doctor deficit in this scenario.

TABLE 7 Target to zero deficit year 2033

Year	Target number of additional new doctors apart from trend addition to meet standard	Target number of additional medical students at given rate of completion and PRC passing rate for scholarship support	Total number of additional medical students supported by scholarship	Cost of scholarships (no adjustment for inflation yet)		
				(A)	(B)	
				Medical school tuition and other fees (in Php million)	(A) + Allowance of Php 100k/year (in Php million)	(B) + Undergrad support for 4 years of Php 40k/year (in Php million)
2018						
2019		8,835	8,835	1,767	2,651	5,826
2020		8,835	17,671	3,534	5,301	8,411
2021		8,835	26,506	5,301	7,952	10,981
2022		8,835	35,341	7,068	10,602	13,552
2023		8,835	44,177	8,835	13,253	16,122
2024	5,964	8,835	44,177	8,835	13,253	16,042
2025	5,964	8,835	44,177	8,835	13,253	15,961
2026	5,964	8,835	44,177	8,835	13,253	15,881
2027	5,964	8,835	44,177	8,835	13,253	15,801
2028	5,964	8,835	44,177	8,835	13,253	15,721
2029	5,964		35,341	7,068	10,602	10,602
2030	5,964		26,506	5,301	7,952	7,952
2031	5,964		17,671	3,534	5,301	5,301
2032	5,964		8,835	1,767	2,651	2,651
2033	5,964					
2034						
TOTAL				88,354	132,531	160,804

* 100% of additional students supported by scholarship for 6-year program
** Cost of medical school tuition and miscellaneous Php 200,000 per year

Zero deficit by 2038

This option proposes a more modest annual support for scholarships and target for new doctors per year and does not require expansion of the carrying capacity of medical schools (*see* Table 8 on page 16). Though the total cost is lower, this is not recommended for the very important reason that the Philippine healthcare system would be instead operating on a doctor deficit for a prolonged period.

Scholarships and other forms of support to eliminate the doctor deficit

The aforementioned projections are aggressive in terms of time frames, but are conservative in terms of goals. These are conservative in their goals because specializations and places of practice were not yet taken into account. Adjusting for those two considerations, the necessary level of support would increase substantially. For the purpose of illustrating the scope and magnitude of intervention and funding needed, the simpler calculations provide sufficient information.

If the government commits to a more ambitious expansion of the number of doctors in the Philippines, it will need to provide support at a larger scale and through multiple avenues of intervention. At the minimum, it would require individual scholarships in the thousands for multiple years (enough to send most of them to private medical schools), some alternative design to reduce the number of years in medical school, and direct engagement with all medical schools to shepherd strategic expansion.

On support through scholarships, the following are the recommended conditions and steps:

- All government-supported scholars should have a return service requirement of 1:1 support-to-service, with the pool of graduates immediately available for deployment in DOH or through LGUs. Delayed service should not be allowed.
- The government should prepare to support the majority of scholarships to private medical schools, even in the expensive

TABLE 8 Target to zero deficit year 2038

Year	Target number of additional new doctors apart from trend addition to meet standard	Target number of additional medical students at given rate of completion and PRC passing rate for scholarship support	Total number of additional medical students supported by scholarship	Cost of scholarships (no adjustment for inflation yet)		
				(A)	(B)	
				Medical school tuition and other fees (in Php million)	(A) + Allowance of Php 100k/ year (in Php million)	(B) + Undergrad support for 4 years of Php 40k/ year (in Php million)
2018						
2019		4,595	4,595	919	1,379	3,397
2020		4,595	9,190	1,838	2,757	4,710
2021		4,595	13,786	2,757	4,136	6,008
2022		4,595	18,381	3,676	5,514	7,307
2023		4,595	22,976	4,595	6,893	8,605
2024	3,102	4,595	22,976	4,595	6,893	8,525
2025	3,102	4,595	22,976	4,595	6,893	8,445
2026	3,102	4,595	22,976	4,595	6,893	8,364
2027	3,102	4,595	22,976	4,595	6,893	8,284
2028	3,102	4,595	22,976	4,595	6,893	8,204
2029	3,102	4,595	22,976	4,595	6,893	8,124
2030	3,102	4,595	22,976	4,595	6,893	8,043
2031	3,102	4,595	22,976	4,595	6,893	7,963
2032	3,102	4,595	22,976	4,595	6,893	7,883
2033	3,102	4,595	22,976	4,595	6,893	7,802
2034	3,102		18,381	3,676	5,514	5,514
2035	3,102		13,786	2,757	4,136	4,136
2036	3,102		9,190	1,838	2,757	2,757
2037	3,102		4,595	919	1,379	1,379
2038	3,102					
2039						
TOTAL				68,928	103,393	125,450

* 100% of additional students supported by scholarship for 6-year program

** Cost of medical school tuition and miscellaneous Php 200,000 per year

ones where most of the available slots are. Capacity constraints at the national level will force this. If an entire cohort of new students can be supported by merit scholarships (in addition to paying students), private medical schools can negotiate for smaller fees, provided a guaranteed headcount over five (5) years and throughout the program. Schools will have to guarantee high board exam passing rates.

- Identify promising students at the senior high school level so that their undergraduate pre-medicine education could be supported. Students from rural areas where doctor shortages are severe should be prioritized.
- To lower the barriers for poor families, scholarships for medical education should be a package for enrollment in the full program until graduation and the board examinations. Ideally, this should include all direct costs (e.g. tuition and miscellaneous fees) and a reasonable living allowance, and also take into account the many expenses in medical school that are not paid to the school (e.g. textbooks, uniforms).
- Coordinate a concerted push to expand the capacity of all public medical schools. This will begin by understanding the real costs of provision, the reasons for keeping the student body small, and the opportunities to experiment with truncated medical programs, and by designing a funding mechanism to support the expansion within a short time frame.
- There will be a two-year period when the K to 12 transition will hit medical schools. In AYs 2020–2021 and 2021–2022, there will be no graduating students from colleges and universities. To fill the slots in medical schools, the government can explore supporting nurses, other professionals in the health sector, and those who obtained their degrees even several years back, to enter medical school by developing bridging programs (similar to the step-ladder curriculum implemented in the UP Manila School of Health Sciences campus in Palo, Leyte), thus ensuring the continued inflow of medical students in these two years.

- The DOH should plan out the expansion of all medical schools in annual increments and provide support by signaling them through targets and multi-year investment commitments to scholarships.

In the face of very high costs for scholarships, a model for a shortened medical education program that truncates the number of years from six to three or four would be worth exploring. UP Manila's INTARMED program is one model that essentially pilots a truncated program, but this is reserved for the highest achievers that enter the university and has a reputation for being a grueling program. However, in the new K-12 basic education cycle, graduates entering the INTARMED program are two years older and have completed more general education courses. This new profile of senior high school graduates may be more prepared for an accelerated medical degree program than their earlier counterparts.

Conclusion

The Philippines' healthcare system falls short of global standards in terms of the ratio of doctors to the larger population. Conservative estimates of current data suggest that this shortfall at the national level is at around 60,000 doctors. With population growth and outmigration, this deficit might persist or get worse. How much and how many years would it take to eliminate the doctor deficit in the country?

Data from medical schools clearly show significant constraints on the side of the supply of doctors. The whole medical education system graduates only around 3,000 students per year, and this number is yet reduced in the passing rates of the medical licensure examinations. Assuming that medical programs are operating at full capacity, we may not ever fill the doctor deficit without significant intervention. Further research is needed to develop an operational roadmap that ties together all stages of the supply chain, from high school, to college, to medical schools, to board exams, and finally, deployment within the country. Since the most severe bottlenecks appear in medical schools,

further research is needed in the area of medical education cycles. Suggestions for possible studies are the following:

- (1) Design a brief survey and conduct interviews of top- and mid-level administrators of medical schools to gain a detailed understanding of capacity, retention, graduation, and projected growth rates;
- (2) Simulate specific costing scenarios for bulk-rate scholarships for new medical students in each HEI, with an eye toward accelerated expansion of program capacities;
- (3) Investigate and search solutions for inevitable major administrative bottlenecks in supporting scholarships for private medical schools;
- (4) Study in detail public medical schools to understand reasons for low (almost nonexistent in some cases) growth in capacity, possibly connecting to program costs through time; and
- (5) Propose governance structures for the planning and rollout of massive spending toward medical school scholarships.

This paper presented simulations for massive spending support for medical doctor scholarships, with various target years in achieving the global doctor-to-population ratio standard. These calculations and formulas can be the basis for more detailed planning, given budgetary and administrative opportunities and constraints. This paper hopes to serve as an aid in policymaking and planning toward the ambitious goal of eliminating the doctor deficit in the country.

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Appendix A

Number of students enrolled in Doctor of Medicine programs
(2012–2017)*

HEI	Province/ City	HEI type	2012– 2013	2013– 2014	2014– 2015	2015– 2016	2016– 2017
Adventist University of the Philippines	Cavite	Private	—	—	—	17	17
AMA Computer College–Makati	Makati City	Private	No data	No data	No data	No data	30
AMA School of Medicine	Makati City	Private	39	39	39	39	314
Angeles University Foundation	Pampanga	Private	83	340	349	340	336
Ateneo de Manila University School of Medicine and Public Health	Pasig City	Private	—	624	624	624	793
Ateneo de Zamboanga University	Zamboanga del Sur	Private	177	187	175	97	195
Baguio Central University	Baguio City	Private	11	—	—	—	—
Bicol Christian College of Medicine	Albay	Private	—	41	41	359	370
Bicol University–Main	Albay	SUC	—	—	62	113	170
Brokenshire College	Davao del Sur	Private	No data	No data	No data	No data	39
Cagayan State University–Tuguegarao (Carig)	Cagayan	SUC	365	359	203	203	490
Cebu Doctor's University College of Medicine	Cebu	Private	515	515	609	606	627
Cebu Institute of Medicine	Cebu	Private	630	640	645	666	995
Central Philippine University	Iloilo	Private	244	278	297	297	334
Davao Medical School Foundation College	Davao del Sur	Private	780	780	1426	2901	2207

* Data compiled by the Office of Planning, Research, and Knowledge Management (OPRKM)–Knowledge Management Division of the Commission on Higher Education (CHED) based on submissions of higher education institutions

HEI	Province/ City	HEI type	2012– 2013	2013– 2014	2014– 2015	2015– 2016	2016– 2017
De La Salle–Health Sciences Institute	Cavite	Private	967	1098	1150	1160	1146
Doña Remedios Trinidad Medical Foundation	Leyte	Private	208	225	245	291	286
Emilio Aguinaldo College	City of Manila	Private	240	258	316	353	350
FEU–Dr. Nicanor Reyes Medical Foundation	Quezon City	Private	1720	1923	1923	2326	2527
Iloilo Doctors' College of Medicine	Iloilo	Private	187	230	230	230	315
Lyceum Northwestern University	Pangasinan	Private	194	216	314	364	398
Manila Central University	City of Manila	Private	306	320	356	361	—
Mariano Marcos State University–Main	Ilocos Norte	SUC	—	—	—	18	43
Metropolitan Hospital College of Nursing	City of Manila	Private	—	—	—	7	27
Mindanao State University–Main Campus (Marawi City)	Lanao del Sur	SUC	—	229	252	252	252
New Era University	Quezon City	Private	—	—	23	43	45
Pamantasan ng Lungsod ng Maynila	City of Manila	LUC	495	495	495	540	530
Saint Louis University	Benguet	Private	596	637	655	661	661
Saint Paul University Philippines	Cagayan	Private	79	150	40	40	54
San Beda College	City of Manila	Private	580	608	496	496	585
Silliman University	Negros Oriental	Private	161	198	223	245	252
Southwestern University	Cebu	Private	—	—	628	654	194
Southwestern University–Matias H. Aznar Memorial College of Medicine	Cebu	Private	794	1181	934	1006	1006

HEI	Province/ City	HEI type	2012– 2013	2013– 2014	2014– 2015	2015– 2016	2016– 2017
St. Luke's College of Medicine–William H. Quasha Memorial	Second District	Private	289	289	200	224	493
University of Northern Philippines	Ilocos Sur	SUC	93	127	153	90	165
University of Perpetual Help–Dr. Jose G. Tamayo Medical University	Laguna	Private	213	463	352	477	410
University of Saint La Salle	Negros Occidental	Private	185	211	231	247	233
University of Santo Tomas	City of Manila	Private	2120	2116	2096	2097	2024
University of the East Ramon Magsaysay Memorial Medical Center	Quezon City	Private	1328	1426	1426	1426	1426
University of the Philippines Manila	City of Manila	SUC	860	41	41	41	839
University of the Philippines Manila (Palo, Leyte)	Leyte	SUC	—	—	—	10	10
University of the Visayas–Gullas College of Medicine	Cebu	Private	430	457	502	502	629
Virgen Milagrosa University Foundation	Pangasinan	Private	199	264	221	221	315
West Visayas State University–Main	Iloilo	SUC	401	304	442	442	454
Xavier University	Misamis Oriental	Private	331	343	341	342	366

Appendix B

Number of graduates from Doctor of Medicine programs
(AY 2015–2016)*

HEI	Province/City	HEI type	2012–2013
Adventist University of the Philippines	Cavite	Private	—
AMA Computer College–Makati	Makati City	Private	30
AMA School of Medicine	Makati City	Private	—
Angeles University Foundation	Pampanga	Private	28
Ateneo de Manila University School of Medicine and Public Health	Pasig City	Private	123
Ateneo de Zamboanga University	Zamboanga del Sur	Private	45
Baguio Central University	Baguio City	Private	No data
Bicol Christian College of Medicine	Albay	Private	29
Bicol University–Main	Albay	SUC	—
Brokenshire College	Davao del Sur	Private	—
Cagayan State University–Tuguegarao (Carig)	Cagayan	SUC	106
Cebu Doctor's University College of Medicine	Cebu	Private	135
Cebu Institute of Medicine	Cebu	Private	277
Central Philippine University	Iloilo	Private	77
Davao Medical School Foundation College	Davao del Sur	Private	200
De La Salle–Health Sciences Institute	Cavite	Private	264

* Data compiled by the Office of Planning, Research, and Knowledge Management (OPRKM)–Knowledge Management Division of the Commission on Higher Education (CHED) based on submissions of higher education institutions

HEI	Province/City	HEI type	2012–2013
Doña Remedios Trinidad Medical Foundation	Leyte	Private	74
Emilio Aguinaldo College	City of Manila	Private	91
FEU–Dr. Nicanor Reyes Medical Foundation	Quezon City	Private	398
Iloilo Doctors' College of Medicine	Iloilo	Private	54
Lyceum Northwestern University	Pangasinan	Private	61
Manila Central University	City of Manila	Private	—
Mariano Marcos State University–Main	Ilocos Norte	SUC	—
Metropolitan Hospital College of Nursing	City of Manila	Private	—
Mindanao State University–Main Campus (Marawi City)	Lanao del Sur	SUC	66
New Era University	Quezon City	Private	—
Pamantasan ng Lungsod ng Maynila	City of Manila	LUC	115
Saint Louis University	Benguet	Private	150
Saint Paul University Philippines	Cagayan	Private	14
San Beda College	City of Manila	Private	106
Silliman University	Negros Oriental	Private	44
Southwestern University	Cebu	Private	37
Southwestern University–Matias H. Aznar Memorial College of Medicine	Cebu	Private	162
St. Luke's College of Medicine–William H. Quasha Memorial	Second District	Private	77
University of Northern Philippines	Ilocos Sur	SUC	—

HEI	Province/City	HEI type	2012–2013
University of Perpetual Help–Dr. Jose G. Tamayo Medical University	Laguna	Private	97
University of Saint La Salle	Negros Occidental	Private	65
University of Santo Tomas	City of Manila	Private	475
University of the East Ramon Magsaysay Memorial Medical Center	Quezon City	Private	264
University of the Philippines Manila	City of Manila	SUC	152
University of the Philippines Manila (Palo, Leyte)	Leyte	SUC	16
University of the Visayas–Gullas College of Medicine	Cebu	Private	102
Virgen Milagrosa University Foundation	Pangasinan	Private	66
West Visayas State University–Main	Iloilo	SUC	109
Xavier University	Misamis Oriental	Private	56

Appendix C

Passing rates (in %) of medical schools in the Professional Regulation Commission (PRC)'s Physician Licensure Examination (2012–2016)*

HEI	Province/ City	HEI type	2012	2013	2014	2015	2016
Adventist University of the Philippines	Cavite	Private	No data	No data	No data	No data	No data
AIE College	Pampanga	Private	—	50.00	—	—	No data
AMA Computer College–Makati	Makati City	Private	No data	No data	No data	No data	0.00
AMA School of Medicine	Makati City	Private	—	33.33	50.00	25.00	50.00
Angeles University Foundation	Pampanga	Private	48.39	80.95	85.71	92.31	94.34
Ateneo de Manila University School of Medicine and Public Health	Pasig City	Private	0.00	0.00	0.00	99.15	95.24
Ateneo de Manila University	Quezon City	Private	98.39	100.00	—	—	No data
Ateneo de Zamboanga University	Zamboanga del Sur	Private	58.06	75.68	75.00	95.00	82.98
Baguio Central University	Baguio City	Private	12.50	30.77	40.00	23.08	No data
Bicol Christian College of Medicine	Albay	Private	11.90	19.05	7.32	13.79	35.90
Bicol University–Main	Albay	SUC	—	—	—	—	No data
Brokenshire College	Davao del Sur	Private	No data	No data	No data	No data	No data
Cagayan State University–Tuguegarao (Carig)	Cagayan	SUC	90.00	75.86	86.67	90.70	66.67
Cebu Doctor's University College of Medicine	Cebu	Private	90.91	96.15	92.75	94.74	89.57
Cebu Institute of Medicine	Cebu	Private	98.48	100.00	100.00	100.00	97.67

* Data compiled by Office of Planning, Research, and Knowledge Management (OPRKM)–Knowledge Management Division, Commission on Higher Education (CHED) based on data from the Professional Regulation Commission (PRC)–Educational Statistics Task Force and CHED's directory of higher education institutions

HEI	Province/ City	HEI type	2012	2013	2014	2015	2016
Central Philippine University	Iloilo	Private	82.35	75.00	84.62	88.68	68.52
Davao Medical School Foundation College	Davao del Sur	Private	80.95	83.58	88.99	90.40	No data
De La Salle–Health Sciences Institute	Cavite	Private	81.99	85.32	83.77	86.36	62.96
Doña Remedios Trinidad Medical Foundation	Leyte	Private	51.85	43.33	61.36	66.67	57.69
Emilio Aguinaldo College	City of Manila	Private	29.86	21.85	22.22	32.00	12.64
FEU–Dr. Nicanor Reyes Medical Foundation	Quezon City	Private	84.15	88.42	84.71	91.22	84.58
Iloilo Doctors' College of Medicine	Iloilo	Private	50.98	56.10	69.23	75.68	62.50
Lyceum Northwestern University	Pangasinan	Private	34.38	42.86	52.78	63.64	40.38
Manila Central University	City of Manila	Private	58.02	63.64	57.14	78.26	54.12
Mariano Marcos State University–Main	Ilocos Norte	SUC	No data	No data	No data	No data	No data
Metropolitan Hospital College of Nursing	City of Manila	Private	No data	No data	No data	No data	No data
Mindanao State University–Iligan Institute of Technology	Lanao del Norte	SUC	—	100.00	—	—	No data
Mindanao State University–Main Campus (Marawi City)	Lanao del Sur	SUC	96.15	93.18	85.25	77.08	69.86
New Era University	Quezon City	Private	No data	No data	No data	No data	No data
Our Lady of Fatima University (Fatima Medical Science Foundation)–Valenzuela	Valenzuela City	Private	46.06	43.66	45.20	60.00	59.62
Pamantasan ng Lungsod ng Maynila	City of Manila	LUC	95.88	99.02	97.90	98.71	99.15
Saint Louis University	Benguet	Private	87.14	92.00	88.79	95.04	82.69

HEI	Province/ City	HEI type	2012	2013	2014	2015	2016
Saint Paul University Philippines	Cagayan	Private	No data	No data	No data	No data	No data
San Beda College	City of Manila	Private	55.91	66.20	61.18	82.83	76.62
Silliman University	Negros Oriental	Private	100.00	100.00	100.00	92.31	85.42
Southwestern University	Cebu	Private	—	—	—	—	46.67
Southwestern University—Matias H. Aznar Memorial College of Medicine	Cebu	Private	55.56	59.26	52.78	70.19	49.31
St. Luke's College of Medicine—William H. Quasha Memorial	Second District	Private	94.74	80.00	93.02	96.49	100.00
University of Northern Philippines	Ilocos Sur	SUC	16.67	47.62	33.33	73.91	52.94
University of Perpetual Help System Dalta	Las Piñas City	Private	29.35	37.50	22.08	48.19	38.82
University of Perpetual Help System—Laguna	Laguna	Private	28.75	—	24.77	31.48	No data
University of Perpetual Help—Dr. Jose G. Tamayo Medical University	Laguna	Private	—	20.83	—	—	13.18
University of Saint La Salle	Negros Occidental	Private	63.16	77.27	80.77	87.18	65.22
University of Santo Tomas	City of Manila	Private	98.78	99.12	98.34	98.16	93.63
University of the East Ramon Magsaysay Memorial Medical Center	Quezon City	Private	95.73	97.38	96.72	96.69	90.58
University of the Philippines Manila	City of Manila	SUC	99.39	100.00	98.72	100.00	98.06
University of the Philippines Manila (Palo, Leyte)	Leyte	SUC	77.78	50.00	76.19	86.67	68.42
University of the Visayas—Gullas College of Medicine	Cebu	Private	36.47	29.52	24.71	35.87	25.00
Virgen Milagrosa University Foundation	Pangasinan	Private	20.00	24.29	14.71	44.23	15.63

HEI	Province/ City	HEI type	2012	2013	2014	2015	2016
West Visayas State University–Main	Iloilo	SUC	96.34	97.40	92.55	98.92	91.74
Xavier University	Misamis Oriental	Private	96.67	93.94	94.00	95.45	89.87

Appendix D

Projections in medical school enrollees and graduates

Academic year	Overall enrollment	Confidence interval (CI)	Enrollment in public schools	CI	Enrollment in private schools	CI
2012–2013	15820		2214		13606	
2013–2014	17612		1555		16057	
2014–2015	18407		1649		16758	
2015–2016	21428		1709		19719	
2016–2017	22952		2953		19999	
2017–2018	25285.79	940.1	2726.99	1206.9	22986.75	450.14
2018–2019	26631.21	1176.25	2924.16	1349.9	23760.19	453.75
2019–2020	29036.62	1373.32	3121.33	1479.63	26401.12	457.46
2020–2021	30382.04	1545.46	3318.5	1599.32	27174.56	461.13
2021–2022	32787.44	1701.05	3515.66	1711.09	29815.5	464.88

Academic year	Overall number of graduates	Confidence interval (CI)	Graduates from public schools	CI	Graduates from private schools	CI
2011–2012	2453		437			2016
2012–2013	2577		314			2263
2013–2014	2829		297			2532
2014–2015	3351		323			3028
2015–2016	4165		564			3601
2016–2017	4434.98	506.84	512.15	241.49	3922.83	272.32
2017–2018	4872.1	566.9	545.92	270.1	4326.19	304.58
2018–2019	5309.22	621.38	579.69	296.05	4729.54	333.85
2019–2020	5746.35	671.64	613.46	320	5132.89	360.86
2020–2021	6183.47	718.58	647.23	342.37	5536.24	386.08

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