

Therapeutics Research • Education • AIDS Training

TREATASIA

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## **TREAT Asia Special Report:**

Expanded Availability  
of HIV/AIDS Drugs in Asia  
Creates Urgent Need  
for Trained Doctors

*July 2004*



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## Executive Summary

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Across Asia and the Pacific, 7.4 million<sup>1</sup> people have already been infected with HIV. Some sources predict that Asia's epidemic could grow to as many as 40 million infected individuals by 2010.<sup>2</sup> For many years, the sheer size of Asia's population, and its limited health-care infrastructure, have augured disaster to public health experts. But the human catastrophe that was once the only possible outcome of AIDS in the developing world is no longer preordained. The proliferation of generic and discounted branded antiretroviral drugs provides hope that the lives of millions needing treatment can be saved.

In addition to the growing availability of deeply discounted branded drugs, at least 27 manufacturers now produce locally made generic antiretroviral drugs. On the eve of a global AIDS conference expected to bring focus to the widespread Asian AIDS epidemic and the unmet need for antiretroviral treatment, Asia faces a new series of treatment access challenges that may impede current and proposed treatment delivery programs. An acute shortage of healthcare workers trained to deliver these lifesaving drugs has emerged as a critical gap in providing safe and effective treatment.

China, the most populous country in the world, has fewer than 200 trained doctors for an estimated 840,000 HIV-infected individuals.<sup>3</sup> Estimates that China could face between 10 and 15 million infected individuals by 2010 point toward the tremendous challenge in training physicians to cope with the escalating epidemic. In India, which is expected to surpass South Africa in 2006 as the country with the single highest number of HIV infections in the world, there are only an estimated 500 trained doctors, or roughly one trained doctor for every 10,000 HIV-positive individuals. Dr. N. Kumarasamy of the YRG Centre for AIDS Research and Education in Chennai estimates that only 25 of these doctors can be considered "fully trained" in all aspects of HIV treatment.<sup>4</sup>

In preparing this report, TREAT Asia consulted with top healthcare officials in 15 Asian countries and interviewed dozens of experts from governments, multilateral agencies, NGOs, and pharmaceutical and generic drug manufacturers. The network also utilized the resources of its regional clinicians and researchers to create the first comprehensive analysis of the impact of the proliferation of antiretroviral drugs (ARVs) and the corresponding shortage of trained healthcare workers in Asia.

Key findings of this report include:

- According to the Joint United Nations Programme on AIDS (UNAIDS), 1.3 million of the 7.4 million people in Asia infected with HIV need antiretroviral treatment. Yet it is estimated that fewer than 100,000 are currently receiving treatment.<sup>5</sup>
- Treatment for HIV/AIDS is becoming increasingly available throughout Asia and the Pacific. In addition to discounted branded medicine, it appears that generic drugs or the active pharmaceutical ingredients (APIs) of these drugs are now produced by at least 27 manufacturers in Asia, compared with only one generic manufacturer in all of Africa.
- Most Asian nations have far too few doctors trained to administer complicated ARV regimens. The discrepancy in physician preparedness ranges from one doctor per 24 people infected with HIV in Japan to one doctor per nearly 11,250 infected people in Vietnam.
- The combination of increasingly available drugs to treat HIV disease and the lack of trained doctors to administer them could lead to widespread misuse and eventually to drug resistance, eradicating years of progress in treatment and prevention of HIV/AIDS across the region.

*The American Foundation for AIDS Research (amfAR) is one of the world's leading nonprofit organizations dedicated to the support of AIDS research, AIDS prevention, treatment education, and the advocacy of sound AIDS-related public policy. Since 1985, amfAR has invested nearly \$220 million in support for its programs and awarded grants to over 2,000 research teams worldwide.*

*TREAT Asia (Therapeutics Research, Education, and AIDS Training in Asia) is a network of clinics, hospitals, and research institutions working to ensure the safe and effective delivery of HIV/AIDS treatments throughout Asia and the Pacific. Through education and training programs developed by experts in the region, TREAT Asia seeks to strengthen HIV/AIDS care, treatment, and management skills among healthcare professionals.*

## Overview of HIV/AIDS in Asia and the Pacific

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Asia is facing an exploding HIV/AIDS epidemic. Between 1980 and 1990, only 855 HIV cases were known throughout the region.<sup>6</sup> The crisis progressed slowly through the 1980s and 1990s, but has steadily grown over the past ten years. UNAIDS reports that in 2003, more than one million people were newly infected with HIV in Asia and the Pacific, bringing the total number of people living with HIV/AIDS in the region to 7.4 million. Epidemiologists predict that by 2010, 20 million people will be infected in India, and 10-15 million in China.<sup>7</sup>

Today the prevalence of HIV in some countries remains relatively low, but with a population that is roughly 60 percent of the world total, even low prevalence translates into huge numbers of infected people. Of course, the prevalence of HIV varies widely between countries [see Table 1] and within countries, and vulnerable segments of the population have disproportionately high HIV infection rates. Male and female commercial sex workers (CSWs) and injection drug users (IDUs) were the first groups to be seriously affected by HIV/AIDS in most of Asia and the Pacific and remain critical engines of the epidemic. But the epidemic is not contained within these at-risk populations. HIV is spreading rapidly to sex industry clients (including sex tourists) and to the sexual partners of both sex workers and IDUs.

Social forces are at the root of Asia's HIV/AIDS epidemic. The economic upheaval of the past two decades has resulted in increased population and environmental degradation encouraging people to move to cities in search of better opportunities. Sexual transmission of HIV is exacerbated by this mobility, with migrant workers spending long periods of time away from home and frequently visiting commercial sex workers, then returning home to infect their spouses, who in turn pass the virus to their children. Throughout the region, HIV is spreading along truck routes, among traveling salesmen, sailors, soldiers, fisherman, and migrant workers, and within the sex industry, which is itself fueled by economic upheaval.

Growing poverty among those who have not benefited from Asia's active role in the global economy is also driving increased injection drug use, and few countries have mounted an effective response to the drug-related HIV epidemic either through peer educa-

tion or syringe exchange programs. There has been little political will to combat HIV among IDUs in the region as the epidemic has often been falsely perceived to be contained in this highly marginalized community.

Gender-based socio-economic disparities also play a significant role in the spread of HIV. Ironically, the highest risk factor for HIV infection among women is often marriage, as men are more likely to engage in extramarital affairs or commercial sex while women have little power to insist on condom use. Fear of violence often deters women from getting tested, revealing their HIV status, or seeking treatment, and inadequate levels of education and access to information prevent women from gaining the knowledge they need to protect themselves. Currently, UNAIDS reports that the rate of HIV infection among women in the Mekong region spanning Vietnam, Laos, and Cambodia is rising at a faster rate than among men.<sup>8</sup>

There are several other important avenues of HIV transmission to consider:

- **Male-to-male sexual activity:** Male-to-male sexual activity is common in Asia, but it is a clandestine practice that is seldom acknowledged. Condom use is low among men who have sex with men (MSM) and many MSM have multiple partners, some of whom are women. In Cambodia, 14 percent of MSM tested in 2000 were infected with HIV, and similar levels of infection have been recorded among male sex workers in Thailand.<sup>9</sup>
- **Mother-to-child transmission:** The increasing number of children with HIV in Asia and the Pacific is alarming. At the end of 2001, there were an estimated 21,000 children living with HIV in Thailand.<sup>10</sup> According to UNICEF, 30,000 babies are born HIV positive each year in India.<sup>11</sup>
- **Exposure to HIV-contaminated blood and blood products:** In the rural provinces of Central China, many poor farmers have become infected through a once thriving blood industry. Some villages in Henan Province – where the blood trade was widely practiced – have been devastated by AIDS [see China, page 12].

The spread of HIV/AIDS is compounded by the prevalence of other diseases, such as tuberculosis (TB), and persistent malnourishment in many parts of Asia. Mounting an effective response to the epidemic in Asia and the Pacific will require increasing the level of resources committed to HIV/AIDS programs and balancing the need for continued prevention efforts with the growing demand for HIV treatments. As the millions of HIV-infected Asians progress to symptomatic AIDS, the demand for treatment and trained doctors will inevitably increase, posing a significant challenge to both national healthcare budgets and existing healthcare infrastructures.

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### Notes on the Data

This report includes novel data gathered from interviews with regional experts and government officials, and statistics and qualitative analysis collected from TREAT Asia sites throughout the region. Although all data are current as of July 2004, epidemiological information is continually shifting. Information about generic drug and API manufacturing is similarly fluid. This has been collected through a broad range of available multilateral and NGO reports, as well as personal interviews with developing country health officials, representatives of generic pharmaceutical companies, and local clinicians. Part of the changing landscape of HIV/AIDS in Asia, this information provides a context for understanding the scope of treatment manufacture and treatment access in Asia.

Local variations in terminology have required TREAT Asia to use consistent definitions of terms such as: "treatment" and "receiving ARVs." "Treatment" has been defined by TREAT Asia to include all common and accepted antiretroviral drugs. "Receiving ARVs" has been defined as taking a consistent supply of appropriately prescribed therapeutics. To avoid any possible confusion, TREAT Asia maintained standard language throughout all questionnaires and interviews, gathered a variety of sources to compare for each region studied, and rejected extreme outlying data.

This preliminary report is the first comprehensive study of its kind. Updates and revisions will be posted on the TREAT Asia Web site at [www.treatasia.org](http://www.treatasia.org).

### Regional Distinctions

It is important to note the differences between developed Asian economies, such as Hong Kong, Japan, Singapore, and Taiwan, and the rest of the continent. In general, these economies have lower HIV prevalence [see Table 1] and much higher levels of treatment. Japan and Taiwan both offer antiretroviral treatment free of charge or heavily subsidized to all citizens who qualify, and have launched widespread education and prevention campaigns targeted at the general population. In addition, groups with the greatest vulnerability to HIV, such as commercial sex workers, IDUs, and migrant workers, are not large populations in these developed economies.

**Table 1. HIV Prevalence by Country**

Country	Total population	Estimated total HIV+ <sup>12</sup>	Prevalence (%; 15-49) <sup>13</sup>
Bangladesh	137,400,000	13,000	0.02%
Cambodia <sup>14</sup>	13,100,000	164,000	2.66%
China	1,300,000,000	840,000	0.12%
Hong Kong, China	7,400,000	3,000	0.06%
India	1,064,750,000	4,580,000	0.86%
Indonesia <sup>15</sup>	212,100,000	125,000	0.11%
Japan	127,100,000	12,000	0.02%
Laos <sup>16</sup>	4,600,000	1,350	0.05%
Malaysia	22,200,000	41,000	0.35%
Myanmar <sup>17</sup>	49,000,000	550,000	2.12%
Nepal	23,000,000	60,000	0.26%
Philippines	75,700,000	6,000	0.02%
Singapore	4,000,000	3,000	0.15%
Taiwan <sup>18</sup>	24,000,000	5,000	n/a
Thailand	62,800,000	670,000	1.83%
Vietnam <sup>19</sup>	78,100,000	225,000	0.52%

**Methodology:** Data on national HIV prevalence has been collected from recent UNAIDS and WHO reports, as well as from local TREAT Asia sites. Where conflicts in data emerged, researchers have taken the mean of divergent data. All original statistics are cited in the endnotes.

# HIV/AIDS Treatment in Asia and the Rise of Generics

More than 1.3 million people in Asia currently need antiretroviral treatment. As indicated in Table 2, most countries in the region are administering antiretroviral medications to fewer than 25 percent of their HIV-infected populations.

In the absence of trained healthcare workers, a significant number of people are likely to begin “self medicating,” independently purchasing antiretroviral drugs in local pharmacies and haphazardly taking drugs with little or no direction. Stories abound of patients who have taken incorrect combinations of drugs, shared limited drug supplies with infected family members, or taken medications for just a few days or weeks each month. Prescriptions from unqualified healthcare workers have left many people with little or no instruction on the safe and proper use of ARVs. In place of an organized delivery and education system, the potential for treatment anarchy threatens the region.

The consequences of widespread “self medication” can be catastrophic. As patients under-medicate or treat HIV with incorrect dosages, the potential for the emergence of drug resistance is significant. Even patients on appropriate medications often develop drug-resistant HIV due to inconsistent supplies of medication.

The need for antiretroviral drugs varies widely throughout the region, mainly in direct relation to the age of the epidemic. Newer epidemics have higher percentages of recently infected people, and therefore populations with lower viral loads. Older, more established epidemics have a much larger percentage of patients in need of ARVs.

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**Generic antiretroviral drug manufacturers have proliferated in Asia in recent years, radically altering the regional treatment landscape.**

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**Table 2. The Unmet Need for Antiretroviral Treatment**

Country	Estimated total HIV+ <sup>20</sup>	Need ARVs (#)	Receiving ARVs (#)	Receiving ARVs (% of need)
Bangladesh <sup>21</sup>	13,000	1,800	n/a	n/a
Cambodia <sup>22</sup>	164,000	22,000	3,400	15%
China <sup>23</sup>	840,000	300,000	7,800	3%
Hong Kong, China <sup>24</sup>	3,000	1,200	1,100	92%
India <sup>25</sup>	4,580,000	702,000	16,700	2%
Indonesia <sup>26</sup>	125,000	12,200	800	7%
Japan <sup>27</sup>	12,000	6,000	3,000	50%
Laos <sup>28</sup>	1,350	n/a	40	n/a
Malaysia <sup>29</sup>	41,000	9,500	2,100	22%
Myanmar <sup>30</sup>	550,000	60,000	1,000	2%
Nepal <sup>31</sup>	60,000	8,000	<100	1%
Philippines <sup>32</sup>	6,000	300	100	33%
Singapore <sup>33</sup>	3,000	1,000	600	60%
Taiwan <sup>34</sup>	5,000	3,900	3,900	100%
Thailand <sup>35</sup>	670,000	124,300	40,800	33%
Viet Nam <sup>36</sup>	225,000	45,000	<2000	4%

**Methodology:** Data on the need for antiretroviral treatment has been collected from a variety of TREAT Asia sites, as well as annual UNAIDS and WHO reports. Some of the data in the table represent mean figures derived from several sources. Please refer to the endnotes for all included sources.

## Generics

Generic antiretroviral drug manufacturers have proliferated in Asia in recent years, radically altering the regional treatment landscape. Together with the increasing availability of affordable branded drugs, this proliferation has created the potential for widespread access to treatment across the region. Unlike Africa, where only one generic antiretroviral manufacturer exists on the entire continent, 27 companies are currently manufacturing antiretroviral drugs or the components of these drugs in eight countries in Asia.

The biggest challenge in ARV production is not producing final formulations, but producing the active pharmaceutical ingredients (APIs) necessary to produce final formulations. ARV production is feasible for most manufacturers, while APIs are enormously expensive and difficult to produce, requiring substantial inventories of raw ingredients and costly equipment. “If I need to treat 100 million patients, at 200

**Table 3. Generic Antiretroviral Manufacturers in Asia**

Country	Company	Export	Products <sup>37</sup>	APIs <sup>38</sup>
Cambodia	Cambodia Pharmaceutical Enterprise <sup>39</sup>	N	lamivudine (3TC), nevirapine (NVP), stavudine (d4T), zidovudine (AZT); 3TC/AZT, 3TC/d4T	n/a
China	Northeast General Pharmaceutical Factory <sup>40</sup>	Y	3TC, d4T, AZT	Y
China	Shanghai Desano Biopharmaceutical Company <sup>41</sup>	Y	didanosine (ddl), d4T, nevirapine (NVP)	Y
China	Top Pharma <sup>42</sup>	Y	Information unavailable	Y
China	Xiamen Mchem Pharma Group <sup>43</sup>	Y	AZT	Y
China	Zhejiang Huahai Pharmaceutical Co. Ltd <sup>44</sup>	Y	ddl, indinavir (IDV)	Y
India	Aurobindo Pharma Ltd <sup>45</sup>	Y	ddl, efavirenz (EFV), IDV, 3TC, nelfinavir (NFV), NVP, d4T, AZT; AZT/3TC, d4T/3TC; AZT/3TC/NVP APIs: ddl, EFV, IDV, 3TC, NFV, NVP, rofinavir (r), saquinavir (SQV), d4T, AZT	Y
India	Cipla Ltd <sup>*46</sup>	Y	ddl, EFV, IDV, NFV, NVP, r, 3TC, AZT, 3TC/d4T, AZT/3TC, AZT/3TC/NVP, 3TC/d4T/NVP, 3TC/EFV/ddl APIs: EFV, 3TC, NFV, NVP, d4T, AZT	Y
India	Dr. Reddy's <sup>47</sup>	n/a	APIs: 3TC, AZT	Y
India	EAS-SURG <sup>48</sup>	n/a	ABC, ddl, IDV, 3TC, NFV, NVP, d4T, AZT; 3TC/d4T/NVP, AZT/3TC	n/a
India	Emcure Pharmaceuticals <sup>49</sup>	n/a	3TC, NVP, d4T	n/a
India	Hetero Drugs Ltd/Genix Pharma Ltd <sup>*50</sup>	n/a	ABC, atazanavir, delavirdine, EFV, IDV, 3TC, NFV, NVP, r, SQV, d4T, tenofovir, AZT; ABC/3TC/AZT, 3TC/AZT, 3TC/d4T, 3TC/d4T/NVP, 3TC/NVP/AZT; r/LPV APIs: ABC, atazanavir, delavirdine mesylate, ddl, EFV, IDV, LPV, NFV, NVP, r, 3TC, d4T, tenofovir, AZT	Y
India	IPCA Laboratories Ltd <sup>51</sup>	n/a	3TC, AZT	n/a
India	Matrix Laboratories Ltd <sup>52</sup>	Y	APIs: ABC, EFV, IDV, 3TC, LPV, NFV, NVP, r, SQV, d4T, AZT	ONLY
India	Ranbaxy Laboratories Ltd <sup>*53</sup>	Y	ABC, ddl, EFV, NVP, IDV, 3TC, d4T; 3TC/d4T, AZT /3TC, AZT/3TC/NVP, 3TC/d4T/NVP, ABC/3TC/AZT	Y
India	Samarth Pharma PVT Ltd <sup>54</sup>	n/a	AZT	n/a
India	Strides Arcolab Ltd <sup>55</sup>	n/a	IDV, 3TC, NVP, r, SQV, d4T, AZT; 3TC/AZT, 3TC/d4T, 3TC/d4T/NVP	N
India	Sun Pharmaceuticals Ltd <sup>56</sup>	n/a	APIs: EFV	ONLY
India	Zydus Cadila Healthcare Ltd/ Zydus Biogen <sup>57</sup>	Y	3TC, AZT, 3TC/AZT APIs: NFV, 3TC	Y
Indonesia	Kimia Farma <sup>58</sup>	n/a	NVP; AZT/3TC	N
Malaysia	Duopharma <sup>59</sup>	n/a	NVP	n/a
South Korea	LG Chemicals/ LG Life Sciences <sup>60</sup>	Y	APIs: AZT	ONLY
South Korea	Korea United Pharma <sup>61</sup>	Y	APIs: AZT	ONLY
South Korea	Samchully Pharm Co., Ltd <sup>62</sup>	Y	APIs: AZT	ONLY
Thailand	Government Pharmaceutical Organization <sup>63</sup>	Y	ddl, 3TC, NFV, NVP, d4T, AZT; 3TC/d4T, 3TC/d4T/NVP	n/a
Thailand	T.O. Chemical <sup>64</sup>	n/a	AZT	n/a
Vietnam	MST <sup>65</sup>	n/a	3TC, AZT	n/a

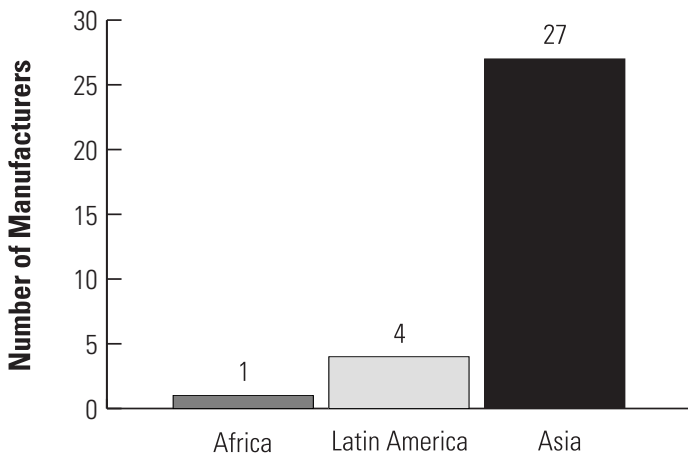
\* WHO pre-qualified

**Methodology:** Information on generic manufacturers has been gathered from a broad range of healthcare institutions and NGO reports, as well as personal interviews with developing country health officials, representatives of generic pharmaceutical companies, and local clinicians. This situation is changing rapidly, with many manufacturers hurrying to introduce new drugs in advance of WTO regulations.

million pills per day, that's no problem," says Yusuf Hamied, the founder and CEO of the Indian generic pharmaceutical manufacturer Cipla. "The problem is who will supply the active ingredients. If there's no predictability of demand, who's going to produce APIs and keep stocks?"

Currently, China and India produce the vast majority of bulk APIs, but do so inconsistently due to shifts in demand for these medications. Hamied called on the international community, including NGOs, the World Bank, the Global Fund, and World Health Organization (WHO), to create a predictable demand for ARV medications, which would allow ARVs and APIs to be produced on a sustainable basis—an important consideration for drug regimens that require rigid adherence over a period of years.

**Chart 1. Generic Antiretroviral Manufacturers by Region**



Source for African manufacturers:

Roelf W. "AIDS Drugs are Available – But Are There Enough?" *Mail and Guardian*. May 17, 2004. Available online at: [www.journ-aids.org/reports/20040517b.htm](http://www.journ-aids.org/reports/20040517b.htm).

Source for Latin America manufacturers:

WHO. *Sources and prices of selected medicines and diagnostics for people living with HIV/AIDS*. June 2003.

### The risk of unqualified manufacturers

While generic antiretroviral manufacturers have provided immense hope that widespread treatment may soon be available, many questions linger about the relative safety and consistency of these drugs. Currently, only three generic manufacturers in Asia — the Indian companies Cipla, Ranbaxy and Hetero/Genix — meet the WHO's benchmark quality standards. The 24 other companies in Asia either have not been reviewed by WHO or do not meet WHO standards and are therefore not monitored for the quality

or quantity of medicines produced. The Cambodian Pharmaceutical Enterprise, for example, produces and sells four AIDS drugs without formal documentation, leaving international officials in Cambodia with no access to data on production or consumption.

In the absence of such basic manufacturer information, substandard AIDS medications can easily be sold to the general population. WHO reports that counterfeiting of treatments for tuberculosis, malaria and AIDS is widespread in Cambodia, China, Laos, Myanmar, Thailand, and Vietnam.<sup>66</sup> A WHO study in Southeast Asia in 2001 revealed that 38 percent of 104 antimalarial drugs on sale in pharmacies did not contain any active ingredients.<sup>67</sup> No regional studies have been done to assess the efficacy of available ARVs, but random testing of drug samples in Vietnam and Myanmar showed that 8 percent and 16 percent respectively were substandard, according to WHO.<sup>68</sup>

Given the lack of available data, a regional database of generic manufacturers is urgently needed. Without such a database, it is impossible to determine which medications are available in a given country, evaluate the quality of those medications, or accurately gauge unmet medication needs among the HIV population.

### Challenges

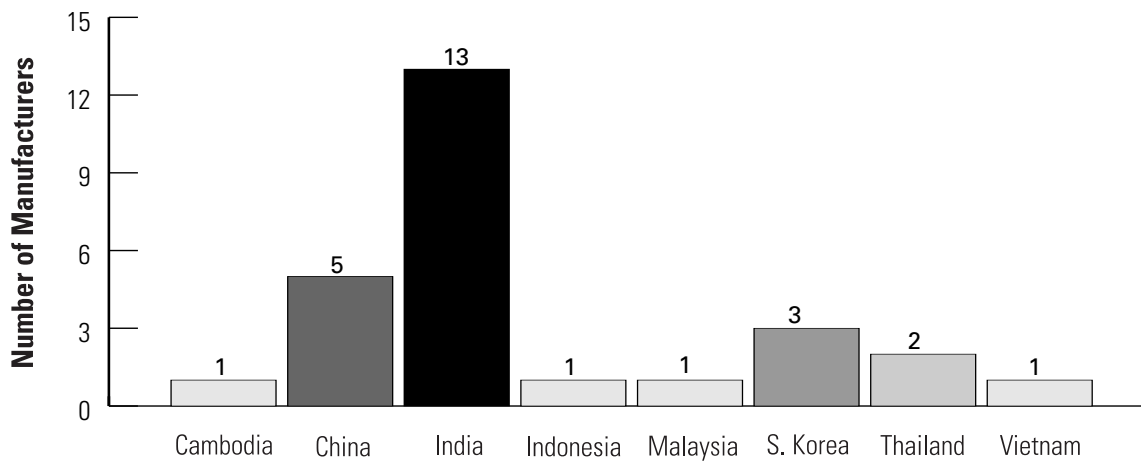
The paucity of healthcare infrastructure in many countries, and the acute shortage of trained doctors in particular, have impaired the ability of governments to set up long-term, lifelong treatment programs for millions of people with HIV.

In addition, many generic manufacturers have focused on the international market over the needs of locally affected populations. For example, in Thailand an estimated 84,000 people need antiretroviral treatment and are not receiving it; yet the Thai Government Pharmaceutical Organization (GPO) reportedly exported US\$3 million worth of HIV/AIDS medications to other countries in Asia and in Africa in 2003. "We have a production capacity for AIDS medicine of about 200 million tablets per year," said Paricharit Claewplodtook, a GPO spokesperson. "Africa is a new market which we are beginning to explore."<sup>69</sup> In the first seven months of 2003, the company exported AIDS medications valued at US\$300,000 to neighboring Cambodia.

In addition to producing antiretroviral drugs, an increasing number of manufacturers have turned to producing APIs. These companies export APIs to



Chart 2. Generic Antiretroviral Manufacturers in Asia



7 other generic producers, allowing them to avoid World Trade Organization rules forbidding the production of patented drugs.

“India and China will take on an increasingly important role in exporting APIs in the future. They are exporting now, but the range of API products that are produced is very limited,” said Peter Graaf of the WHO AIDS Medicines and Diagnostic Service Department.

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**Within weeks of the launch of China’s free treatment program for 5,000 people with HIV, more than 20 percent of patients had already stopped taking medications, creating fertile ground for drug resistance.**

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### Signs of progress

Many governments, such as those in Thailand, India and China, have recently launched new treatment access programs, promising to expand critical health-care infrastructure throughout the region. But these government programs also face challenges. Within weeks of the launch of China’s free treatment program for 5,000 people with HIV, more than 20 percent of patients had already stopped taking medications, creating fertile ground for drug resistance. Observers reported seeing healthcare workers “simply handing patients bottles of pills” without counseling.<sup>70</sup>

To prevent the spread of drug-resistant strains of HIV, the region requires a vast expansion of health-care infrastructure, as well as a regional prevention education campaign aimed at high-risk populations. These programs should be included in a coordinated, multi-faceted approach to HIV prevention and treatment.

## The Need for Trained Doctors

The capacity of Asian and Pacific nations to address escalating HIV epidemics rests not only on the availability, cost, and effectiveness of ARVs. The health-care infrastructure of these countries, and their human resources in particular, will also play an important role in the region's ability to prevent HIV/AIDS from overwhelming Asia.

Though most regions of Asia have a cadre of health-care professionals, few have a sophisticated understanding of HIV/AIDS. Fewer still understand complicated treatment regimens and know how to administer appropriate combinations of ARVs while promoting adherence, monitoring viral load and T-cell counts, treating side effects, measuring resistance, and disseminating information on the broader epidemiological issues among affected and infected populations. The role of the physician in treatment scale-up cannot be overstated. Yet across Asia, trained doctors remain few and far between.

Consider the case of Thailand, which in October 2003 was among the first non-Western countries to begin to offer free ARVs to some people living with AIDS. Although Thailand boasts one of the more sophisticated healthcare systems in Southeast Asia, there are only an estimated 100 physicians trained to treat HIV/AIDS in the country. If one considers the WHO estimate of the number of HIV infected people in Thailand, there is a single physician for every 6,700 patients infected with HIV.

Thailand is in better shape than most Asian nations. As Table 4 indicates, most countries in Asia lag far behind in physician preparedness. Again, there is a pronounced discrepancy between wealthy and resource-limited nations. In Japan's well-controlled HIV epidemic, a single physician trained in HIV/AIDS treats an average of 24 HIV-infected patients, while in India, the conservative sero-prevalence figure of 4.5 million suggests that one trained doctor exists for nearly 10,000 patients.

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**Table 4. Trained Doctors**

Country	Total HIV+ (#) <sup>71</sup>	Trained doctors (#)	HIV infected people per doctor
Cambodia <sup>72</sup>	163,500	50	3,270
China <sup>73</sup>	840,000	200	4,200
Hong Kong, China <sup>74</sup>	3,000	10	300
India <sup>75</sup>	4,580,000	508	9,016
Indonesia <sup>76</sup>	125,000	27	4,630
Japan <sup>77</sup>	12,000	500	24
Malaysia <sup>78</sup>	41,000	31	1,323
Myanmar <sup>79</sup>	547,500	225	2,433
Philippines <sup>80</sup>	6,000	7	857
Singapore <sup>81</sup>	3,000	8	375
Taiwan <sup>82</sup>	4,613	50	92
Thailand <sup>83</sup>	670,000	100	6,700
Vietnam <sup>84</sup>	225,000	20	11,250

**Methodology:** These figures are based primarily on interviews with TREAT Asia researchers and clinicians at local sites, Asian government officials, and Asian NGO and international agency officials. Some of the data in the table represent mean figures derived from several sources. Please refer to the endnotes for all included sources. The chart uses doctors as the standard measure of regional health capacity, though it should be noted that a variety of health-care professionals and others, including nurses, paraprofessionals, clergy and family members, are involved in the distribution of ARVs in Asia. The complex nature of HIV treatment regimens and the sophisticated monitoring that is required make a strong case for training doctors as primary caretakers wherever possible.

Note: Sufficient data on number of trained doctors was unavailable for Bangladesh, Laos, and Nepal.

### The doctor gap

The pronounced lack of trained doctors has had profound consequences beyond the delivery of antiretroviral drugs and monitoring disease progression. "In most of the world, physicians take on responsibilities far afield from practicing medicine," said Dr. Kenneth Mayer, of Brown University Medical School, who has worked extensively with clinicians in India. "In places where HIV is understood by very few people, doctors are called upon to be prevention experts, mentors, and even community activists battling pervasive ignorance about AIDS and other infectious diseases."<sup>85</sup>

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## **No treatment access program will succeed without trained healthcare providers who understand how to care for an HIV-infected patient, regardless of how inexpensive and plentiful drugs become.**

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In resource-limited countries, doctors frequently assume an advocacy role for people living with AIDS.

The persistent stigma associated with HIV has caused many people to be rejected by their families or turned out of the workplace. In the absence of doctors, the human rights of people living with HIV are ignored by governments and local communities alike.

9 | The lack of doctors trained in HIV/AIDS has implications for preventing transmission as well. Unlike in developed countries, where community groups and peer educators usually take the lead in prevention efforts, physicians with a sophisticated understanding

of HIV transmission in the developing world often serve as the front-line prevention experts. Doctors without training in HIV can, in some instances, exacerbate infection rates through unsafe medical practices. One study estimates as many as 30 percent of HIV infections could be prevented if unsafe medical practices were corrected.<sup>86,87</sup>

In response to the shortage of AIDS doctors, standard curricula in many Asian medical schools have begun to include AIDS treatment, but the available training is inadequate for the needs of local populations. “The time has come to focus on training doctors and other caregivers in Asia on the fundamentals of HIV and AIDS,” said Dr. Marie Charles, President of the International Center for Equal Healthcare Access (ICEHA), a not-for-profit group that seeks to leverage Western expertise against the overwhelming need for clinical training all over the world. “While the increase in available drug supplies worldwide is a positive step, our work and the work of others suggests that the successful implementation of HIV/AIDS treatment and prevention programs is being severely hampered by the lack of an existing network of health care professionals capable of carrying the caseload. No treatment access program will succeed without trained healthcare providers who understand how to care for an HIV-infected patient, regardless of how inexpensive and plentiful drugs become.”<sup>88</sup>

## A Way Forward

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More than 15 years separate the widespread emergence of AIDS in Africa and Asia, and the epidemiological circumstances have changed dramatically. The rapidly growing supply of generic antiretroviral drugs provides hope that Asia may avoid the disastrous path of much of sub-Saharan Africa. However, without a rapid scale-up in training for healthcare workers, these antiretroviral drugs will not have their intended consequence.

Asia urgently requires a rapid expansion of healthcare infrastructure, including research, training, and community education, in order to meet the needs of its growing HIV-positive population. This requires the coordinated effort of local governments, NGOs, multilateral organizations, and the private sector, as well as the ongoing support of international donors.

This report is intended to alert governments and those working in the public health and research communities to the urgent need for continued support and collaboration. As a first attempt to consider the intersection of treatment and physician training, it shows how the potential benefits of treatment scale-up will not be realized without adequate training to complement the increased availability of generic and discounted drugs.

In order for this region to combat the epidemic successfully, it is imperative that patient tracking, observation, and data collection be improved. It is equally clear that the discrepancies in resources that exist in Asia place a burden of leadership, training, and financial assistance on wealthier countries. As no single organization can solve the problem alone, regional research and training can and should be a collaborative enterprise.

TREAT Asia is one important component of this cooperative approach. In 2002 amfAR launched Therapeutics Research, Education, and AIDS Training in Asia, or TREAT Asia, to help stem the tide of HIV/AIDS in Asia and the Pacific. TREAT Asia seeks to strengthen HIV/AIDS care, treatment, and management skills among healthcare professionals through educational programs developed by experts in the region.

Since 2002, the TREAT Asia network has grown to include 24 treatment sites throughout the region, offering clinical care to populations ranging from 200 to 4,000 patients. The recent influx of generic antiretrovirals in Asia, as well as the expanding availability of discounted branded drugs, has bolstered the possibility of treatment for large HIV-positive populations through an infrastructure of these local clinics. This is particularly true in countries such as Thailand,

where the Government Pharmaceutical Organization manufactures yearly ARV supplies for thousands of Thais, and Malaysia, where the government has purchased large quantities of brand-name AZT (Retrovir, GlaxoSmithKline) for more than a decade, and has recently signed an importing contract with Indian generic manufacturer Cipla.

Treatment requires both medication production and safe distribution. Asia has risen to the challenge of the first component, but outside help is needed to deliver the second. Even some of Asia's strongest healthcare systems, such as Thailand's, lack the specialized knowledge necessary for the effective administration of ARV drug regimens. Without trained doctors, the 7.4 million HIV-positive people of Asia simply cannot receive the treatment that will extend their lives and greatly reduce the impact of the epidemic.

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**Asia urgently requires a rapid expansion of healthcare infrastructure, including research, training, and community education, in order to meet the needs of its growing HIV-positive population.**

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## Country Profiles

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**Introduction:** *The six countries profiled in this section – Cambodia, China, India, Indonesia, Thailand, and Vietnam – are broadly representative of the wide-ranging characteristics of the HIV/AIDS epidemics in the region. The epidemics in these six countries are driven, to varying degrees, by intravenous drug use, the commercial sex industry, and blood donor populations.*

### • CAMBODIA

#### The Shape of the Epidemic

Cambodia's HIV prevalence rate is the highest in Asia,<sup>89</sup> with around 164,000 Cambodians living with HIV, or about 3 percent of the total population.<sup>90</sup>

Cambodia's epidemic has been spread mainly through heterosexual sex – and sped by Cambodia's flourishing sex industry. Primary infections in sex workers often spread to their clients, and then to the wives and children of those clients. Hospital-based testing of pregnant women found HIV rates of three percent,<sup>91</sup> evidence that the epidemic is established in the general population. It is predicted that by 2005, Cambodia will be home to an estimated 145,000 AIDS orphans.<sup>92</sup>

Like Thailand, Cambodia reacted quickly to its epidemic and experienced a drop in the number of HIV-positive people from 220,000 in 1999. That decline is attributed to two events—successful prevention efforts, including an NGO-led campaign to achieve 100 percent condom use in brothels (Population Services International, for example, has distributed more than 20 million condoms in seven years to a male population of approximately 6.5 million) and AIDS-related deaths. Only an estimated 10,000 HIV-positive Cambodians are aware of their status,<sup>93</sup> most of whom live in Phnom Penh, where they benefit from NGO care and support.<sup>94</sup>

But the strong emphasis placed on HIV prevention by Cambodian health authorities has left treatment neglected at the national level. Only 100 specialized beds are earmarked for adult AIDS patients in the whole country, 60 of them in the Preah Bath Norodom Sihanouk hospital in Phnom Penh.<sup>95</sup>

#### Treatment Availability

The government healthcare system lacks the infrastructure to establish long-term, lifelong HIV treatment programs for hundreds of thousands of Cambodians, leaving aid organizations scrambling to fill the gaps. According to the National Center for HIV/AIDS, Dermatology, and STDs (NCHADS) and the Ministry of Health, there are 24,189 people living with

AIDS who need ARV therapy in Cambodia, while only 3,389 patients are currently receiving it. However, experts in the field question whether the patients who are receiving treatment truly have access to an uninterrupted supply of quality anti-retroviral medication. Other reports indicate that fewer than 500 people are receiving properly administered ARV medications,<sup>96</sup> while fewer than 3 per-

cent of people with advanced HIV infection are currently receiving free ARV treatment.<sup>97</sup> Médecins Sans Frontières offers antiretroviral drugs in three Cambodian cities, and currently distributes ARVs to 950 patients.<sup>98</sup> Wealthy Cambodians who know they are HIV positive frequently self-medicate with ARVs purchased over the counter.<sup>99</sup>

Cambodian Pharmaceutical Enterprise, a partially government-owned company,<sup>100</sup> produces the AIDS medications stavudine, lamivudine, and zidovudine. The company is not approved nor monitored by the WHO. A one-month supply of ARVs in Phnom Penh costs \$37, and pharmacies in Phnom Penh report a steady trickle of ARV customers.<sup>101</sup>

#### Physician Preparedness

The Cambodia Ministry of Health reports that 60 doctors have been trained by NGOs to deliver ARV treatments,<sup>102</sup> though the poor training of many Cambodian health personnel has proved to be a stumbling block for HIV treatment efforts.<sup>103</sup> A September 2003 report by the International AIDS Alliance described the need for trained healthcare workers:

“The doctors involved in providing HIV/AIDS care through MSF, MDM, and Center of Hope are receiving full training on ARV treatment. There is no clear training in the use of ARVs provided elsewhere, either in

public or private hospitals, or to those in supervisory positions with the Ministry of Health or with NGOs. Despite this, many doctors have been prescribing ARVs in private practice for several years.”

## • CHINA

### The Shape of the Epidemic

China’s low national HIV prevalence of 0.12 percent (840,000 HIV-positive people in a country of 1.2 billion) obscures the fact that serious, concentrated epidemics are well underway in some regions and are beginning to emerge in others.<sup>104</sup> Unofficial prevalence estimates vary widely, with some placing the number of HIV infections well over 1.5 million. Epidemiologists predict that by 2010, there may be 10–15 million Chinese living with HIV/AIDS.<sup>105</sup>

The epidemic has been fueled in part by injection drug use. According to UNAIDS, HIV prevalence rates among IDUs in Xinjiang Province range from 35–80 percent. In Guangdong province, 20 percent of IDUs are HIV positive. Yunnan province, which is adjacent to the Golden Triangle’s international drug routes, has the highest infection rate in the country.<sup>106</sup>

Exposure to HIV-contaminated blood and blood products has also been a significant source of HIV transmission in the country. In the rural provinces of Central China, many poor farmers have become HIV-infected through the region’s once thriving blood industry. So-called “blood-heads” obtained samples from these farmers, often using the same needle repeatedly. The donated blood was then pooled and the plasma removed and sold to hospitals and blood banks. Afterwards, many of the donors were reinfused with the pooled blood, a process that allowed them to donate more frequently. In 1994, a blood product later admitted to contain HIV was disseminated to thousands in the general population;<sup>107</sup> as many as 250,000 blood donors were infected in the 1990s.<sup>108</sup>

### Treatment Availability

In 2003, the Chinese government initiated cost-free ARV treatment for 5,000 HIV patients. While lauded by the international community, *The New York Times* classified the program as “already failing” just weeks after launch, when more than 20 percent of patients had already stopped taking medications, and health-care workers were “simply handing patients bottles of pills” without counseling.<sup>109</sup>

Dr. Taisheng Li, an AIDS doctor at Peking Union Medical Hospital, estimates that there are approximately 300,000 people in China who need ARV treatment, and only 7,800 currently receiving treatment. Official estimates of people receiving ARVs dip as low as 5,000.

Though China is home to three major AIDS medication manufacturers who produce generic versions of ddI, d4T, AZT, indinavir, and nevirapine, the majority of their gross product is exported. In fact, China is expected to become the leader in exporting ARV pharmaceutical ingredients, according to Peter Graaf of the WHO Department of HIV/AIDS.

The largest of the country’s manufacturers is Shanghai Desano Biopharma Co. Ltd, which produces ARVs to treat 500,000 patients each year and exports seven kinds of ARV materials to India, Thailand, and Brazil. Ten additional Chinese companies have recently applied for similar patent permission.<sup>110</sup> A one-year supply of these medicines costs between US \$435 and \$650 for Chinese patients.<sup>111</sup>

### Physician Preparedness

Despite the availability of ARVs within China, a dearth of doctors trained to treat HIV/AIDS contributes to the low numbers of those patients receiving, and adhering to, treatment. “We estimate that there are about 200 doctors trained to deliver ARVs in China at present, which is approximately one doctor for every 5,000 HIV patients,” said Dr. Taisheng Li.<sup>112</sup>

## • INDIA

### The Shape of the Epidemic

India is experiencing low nationwide HIV prevalence that obscures very serious epidemics occurring in specific populations and locations. Even a low prevalence in a country as populous as India translates into significant numbers of people who are infected. Current estimates of the number of people living with HIV in India vary widely. UNAIDS puts the figure at 4.6 million.<sup>113</sup> However, since 1999, experts have voiced concern that low testing rates produce misleading statistics.<sup>114</sup> If India is allowed to pass 5 percent HIV prevalence, which is a marker of future exponential increases, the disease could quickly spread throughout the country. Already, India is poised to surpass South Africa as the nation with the greatest number of people living with HIV by 2006.

India's HIV epidemic began in 1986 and has been spread primarily by sexual contact, particularly by truck drivers among whom infection rates have reached 5-10 percent in certain regions.<sup>115</sup> Sexually transmitted diseases are relatively common across India and facilitate HIV transmission.<sup>116</sup>

Since 1992, the Indian Ministry of Health has partnered with WHO, USAID, UNAIDS, and the World Bank, under the National AIDS Control Organization, to launch HIV prevention programs focusing on condom use. Though the Supreme Court of India has banned the use of blood from professional blood sellers, the trade still continues and contributes to the epidemic's spread.<sup>117</sup>

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**The widespread abuse of ARVs is my major concern, particularly with the use of suboptimal regimens. Controlled and rational use of ARVs is the major challenge and has to be tackled by various means.**

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#### Treatment Availability

By the time most people in India learn they are HIV positive, they are already in need of treatment, according to Dr. N. Kumarasamy of the YRG Centre for AIDS Research and Education in Chennai. "Most of the HIV-infected persons diagnosed in India are sick with one or more opportunistic infections. Many of them need [ARVs]."

Dr. Sanjay Pujari, an AIDS doctor at Ruby Hall Clinic, estimates that between 500,000 and 1 million HIV/AIDS patients currently need ARVs, of which only 20-30,000 are receiving them. The government recently launched a program to support ARV treatment, though most HIV patients are not poor enough to qualify for the program.

Those who cannot afford professional treatment often self-prescribe ARV medications, which are available over the counter.<sup>118</sup> India is home to 13 pharmaceutical companies producing ARVs. The companies manufacture a wide variety of AIDS therapies, and are mass exporters of generic drugs and pharmaceutical

ingredients to other Asian countries. Cipla and Ranbaxy are the largest and most well known, producing a one-year treatment supply for about \$350 in India.<sup>119</sup> Ranbaxy currently exports ARVs to 35 countries in Africa, Asia, Latin America, and the Caribbean, and is awaiting registration in an additional 25 countries.<sup>120</sup>

The availability of ARVs coupled with few doctors who are trained to treat AIDS patients is contributing to the growth of drug-resistant HIV. "The country is progressing towards a drug-resistant HIV epidemic," said Dr. Pujari. "The widespread abuse of ARVs is my major concern, particularly with the use of suboptimal regimens. Controlled and rational use of ARVs is the major challenge and has to be tackled by various means."

#### Physician Preparedness

Dr. Pujari estimates that there are only 1,000 doctors trained to treat HIV patients in all of India, an average of one doctor for every 5,000 HIV-positive citizens, while Dr. Kochar of the International AIDS Vaccine Initiative estimates that there may only be 500 trained doctors. Dr. Kumarasamy makes the much more conservative estimate that there are only 25 well-qualified AIDS doctors for ARV distribution. What is needed, he says, is increased and continuing training on the usage of ARV therapy.<sup>121</sup>

#### • INDONESIA

##### The Shape of the Epidemic

Throughout the 1990s, Indonesia's HIV prevalence remained low. In 1998, it was estimated to be less than 1 percent, even in at-risk populations such as sex workers, MSM, and IDUs.<sup>122</sup> But, Indonesia's HIV-positive population has ballooned over the last five years, spurred by a growing sex industry, low levels of condom use, limited STD treatment services, and high STD rates among sex workers. According to USAID, HIV rates among sex workers and transvestites range from six to 26 percent, and the prevalence of sexually transmitted diseases among sex workers in Jakarta was 53 percent in 2000.<sup>123</sup>

HIV prevalence in the general population has also increased, fueled by economic and political disruptions that led many people to migrate from rural to urban areas. UNAIDS estimates that there are approximately 130,000 people living with HIV in Indonesia.<sup>124</sup>

In 2001, Indonesia began a government decentralization initiative that transferred public health services to the domain of local governments. Many programs and services were unstable during the transition, and experts are concerned that, though locally based HIV prevention programs may increase awareness of AIDS and provide locally appropriate programs, they may be unable to address the larger nationwide issues that perpetuate the epidemic.<sup>125</sup>

### **Treatment Availability**

Until late 2003, Indonesia imported antiretroviral drugs from India and Thailand, at a cost to consumers of \$75 per month. In December 2003, the Indonesia Food and Drugs Supervisory Board issued a license for ARV production to local company Kimia Farma. The company began producing ARVs at a cost of \$53 per month in early 2004. The Indonesian government offers a medication subsidy of \$23 per patient each month,<sup>126</sup> at a total cost to the government of \$43,000 per year. Much of the ARV treatment is funded by support from the Global Fund to Fight AIDS, TB and Malaria.

Kimia Farma Director Gunawan Pranoto told reporters that his company can produce a supply of medication for 2,000 patients per year.<sup>127</sup> The company imports raw materials from South Korea and India, an arrangement that skirts WTO regulations forbidding certain companies to export generic ARV drugs, but allows the export of ingredients.

The company, which produces branded versions of lamivudine, nevirapine and zidovudine, including a combination of lamivudine/zidovudine, and a lamivudine/zidovudine/nevirapine combination, announced that ARV medications would be available at government and private licensed institutions, and that production rates would be determined by requests from those organizations. *The Jakarta Post* announced that the drugs would also be available at the 300 Kimia Farma pharmacies across the country, where HIV-positive people can purchase the medicines without a prescription, fueling concerns that self-medication without medical supervision will follow.<sup>128</sup> There are currently 30 doctors in Indonesia trained to deliver HIV medication,<sup>129</sup> causing further worry about future drug resistance in Indonesia.

## • THAILAND

### **The Shape of the Epidemic**

Thailand's ascent to the AIDS pinnacle of Asia was swift. Five cases of HIV were reported in Thailand in 1985.<sup>130</sup> That number mushroomed to 750,000 in 2000, with some estimates as high as four million.<sup>131</sup> Today, WHO officially estimates that there are 670,000 HIV-positive people in Thailand. HIV prevalence in the country currently hovers below two percent. When AIDS emerged in the 1990s, Thailand, one of Asia's most prosperous countries, was home to hundreds of international aid organizations. NGOs quickly spearheaded prevention efforts by increasing condom use in commercial sex and decreasing brothel solicitations.<sup>132</sup> The government developed a national AIDS policy that allowed foreign researchers and pharmaceutical companies to access Thai viruses and initiated anonymous testing services through the Thai Red Cross.

Those efforts have born fruit. Since 2000, HIV prevalence has dropped to 1.9 percent. Despite that success, condom use has begun to decrease in Thailand, leading to fears that HIV rates may spike again. "It is likely we will have a second-wave epidemic soon," said Dr. Praphan Phanuphak, Director of the Thai Red Cross Society's AIDS Research Centre. "We are starting to see this among MSM, IDU, and youths."

Though prevention efforts continue to focus on brothels, women outside the sex work field constitute the newest HIV risk group. To address increasing infections in that population, the country has launched education programs aimed at long-term couples and so-called "sweetheart" relationships, or long-term relationships between non-married couples.

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**Though prevention efforts continue to focus on brothels, women outside the sex work field constitute the newest HIV risk group.**

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### Treatment Availability

Thailand's strong focus on prevention has neglected efforts to develop effective distribution methods for ARV medications. WHO estimates that there are currently 98,000 Thais who need ARV treatment and only 13,000 receiving it. Dr. Phanuphak views those estimates as conservative and suggests that more than 200,000 Thais need ARV treatment of whom only 80,000 have access to medicines. WHO aims to treat 48,000 Thai HIV/AIDS patients with ARV therapy by 2005, which will still leave 50,000 HIV-positive Thais without treatment.

Antiretroviral medication is relatively inexpensive in Thailand. The Government Pharmaceutical Organization (GPO) produces a fixed-dose combination of stavudine, lamivudine, and nevirapine that is available to Thais for less than \$1 per day.<sup>133</sup> Organizations working in Thailand, such as Médecins Sans Frontières, are able to easily obtain quality generic medications locally. Anecdotal evidence suggests that thousands of Thais purchase ARVs over the counter, a situation in which they receive no guidance on how to properly administer the medications.

### Physician Preparedness

Though HIV-positive Thais have access to ARV medication over the counter, it is estimated that Thailand has only 100 doctors trained to treat HIV.<sup>134</sup> "More than half of the patients currently on ARV are getting fixed-dose combination of d4T/3TC/NVP with limited access to viral load and resistance testing," says Dr. Phanuphak. This means they are not receiving treatment adjusted to their specific HIV strains and stage of disease. "Failure will be detected late, which will make salvage regimens very difficult and very expensive."

## • VIETNAM

### The Shape of the Epidemic

Vietnam is currently experiencing HIV prevalence of well below one percent. Though known diagnoses of HIV are currently 80,000,<sup>135</sup> unofficial estimates put the number of Vietnamese living with HIV at 320,000, with 45,000 of them in need of ARV treatment.<sup>136</sup>

Sixty-five percent of Vietnam's HIV infections are occurring among drug users, and HIV prevalence rates ranging from 11 percent to 24 percent have been found among urban sex workers.<sup>137</sup> These numbers indicate localized, raging epidemics that are hidden by Vietnam's countrywide statistics.

Meanwhile, recent overhauls in the country's health-care system have resulted in cuts in public funding for all types of HIV care. According to Médecins Sans Frontières, "the Vietnamese government is reducing its investment in public health services and encouraging the private sector to get involved in providing healthcare. As a result, poor rural people and ethnic minorities have little access to quality care, even though the country has experienced an overall improvement in living standards over the past ten years."<sup>138</sup>

### Treatment Availability

Healthcare budget cuts and new regulations in the past three and a half years have forced Médecins Sans Frontières to abandon AIDS treatment programs in Vietnam, including eliminating a Nha Trang HIV/AIDS clinic that had performed 45,000 consultations in five years.<sup>139</sup> In their absence, it is estimated that less than 2,000 patients (four percent of those who need ARVs) are currently receiving ARV treatment in Vietnam.<sup>140</sup> The Ho Chi Minh Hospital of Tropical Diseases provides treatment to half of those patients.<sup>141</sup>

Two priority groups receive free, state-paid ARV treatment: HIV-exposed healthcare providers, who are given post-exposure prophylaxis, and pregnant women (for the prevention of mother-to-child HIV transmission).<sup>142</sup> This policy leaves the majority of the country with no access to treatment, including the HIV-positive IDU community, which comprises the majority of the epidemic.

The international community is attempting to fill that gap. A recent grant from the Global Fund to Fight AIDS, Tuberculosis, and Malaria is intended to extend ARV treatment to 750 patients by 2005, which will still barely touch the estimated 45,000 who need ARV treatment.

### Physician Preparedness

There are an estimated 20 doctors trained to treat HIV in Vietnam—a ratio of one AIDS doctor to every 11,250 HIV patients. The Minister of Health, Tran Thi Trung Chien announced in April: "By 2005, 15,000 of Vietnam's HIV patients should be able to buy anti-retroviral medicines cheaply."<sup>143</sup> An accompanying distribution infrastructure has not been announced, leading to concerns over the potential for widespread self-medication.

# Appendix 1

## Asian Generic ARV Manufacturers

**Note:** This material has been gathered from documents provided by the generic manufacturers.

### • CAMBODIA

#### **Cambodia Pharmaceutical Enterprise (CPE)**

Products: 3TC, d4T, AZT, 3TC/AZT, 3TC/d4T. EFV and NVP are in development. It is believed that CPE is producing final formulations for the domestic Cambodian market only.

Cambodia Pharmaceutical Enterprise is 48 percent state-owned, with the remaining 52 percent belonging to a Hong Kong company. CPE has a government license to produce pharmaceuticals and complies with internationally-recognized GMP regulations, similar to the ISO 9000. The company is awaiting WHO pre-qualification in order to be eligible for official public distribution. CPE products are available privately, mainly in Phnom Penh. The 3TC/d4T combination costs approximately US\$30 per month. d4T alone costs US\$4.50/month for 20 mg and US\$7/month for 40 mg. Product details and prices listed below.<sup>144</sup>

Product	Dosage	Price (USD/60 tablets)
lamivudine	150 mg	\$9.50
stavudine	15 mg	\$3.00
stavudine	20 mg	\$3.20
zidovudine	300 mg	\$16.50
zidovudine/lamivudine	300mg/150mg	\$24.50
Lamivudine/stavudine	150mg/30mg	\$12.50

Contact information unavailable

### • CHINA

#### **Northeast General Pharmaceutical Factory (NEGPF)**

Products: 3TC, d4T, AZT. Northeast General produces active pharmaceutical ingredients (APIs) and final formulations for both the domestic Chinese market and for export.

Established in 1946 and based in Shenyang, the state-owned Northeast General Pharmaceutical Factory has over 10,000 employees. Its products are sold to all provinces, municipalities and autonomous regions in China as well as 55 countries and regions worldwide. The annual export sales income of NEGPF totals nearly US\$80 million. NEGPF exports API products to developing countries in Africa, Latin America and Asia, including Korea, India and Brazil. In August 2002, the Chinese government approved the domestic production and sale of stavudine (d4T) and zidovudine (AZT). The per-patient cost of treatment is approximately US\$360-\$600 per year.<sup>145</sup>

#### **Northeast General Pharmaceutical Factory**

No. 35 The Youth Street  
Shenhe District  
Shenyang, China  
POD 11014  
www.negpf.com

#### **Shanghai Desano Biopharmaceutical Co.**

Products: ddl, d4T, NVP. Shanghai Desano produces active pharmaceutical ingredients and final formulations for both the domestic Chinese market and for export.

Shanghai Desano employs 1,600 people and plans to produce enough drugs to supply 500,000 people with combination therapy each year. In September 2002, the company received approval from the Chinese government to produce ARVs for the domestic Chinese market. Treatment costs approximately US\$435 - \$560 per patient per year. Shanghai Desano also exports seven anti-AIDS compounds to India, Thailand and Brazil. Product details listed below.<sup>146</sup>

Product	Specification	Dosing and Dosage
Didanosine powder	10bag X 250mg	250mg twice daily
Didanosine powder	10bag X 167mg	267mg twice daily
Stavudine capsule	60 X 20mg	40mg twice daily
Nevirapine tablet	60 X 200mg	250mg once daily

#### **Shanghai Desano Biopharmaceutical Co.**

No.78, 887 Zuchongzhi Road,  
Zhangjiang Hi-Tech Park  
Shanghai 201203  
China  
www.desano.com

#### **Xiamen Mchem Pharma Group**

Products: AZT. Xiamen Mchem Pharma Group produces APIs and final formulations for both the domestic Chinese market and for export.

In September 2002, Xiamen Mchem Pharma Group reported that it had signed a five-year contract with the Brazilian Government to become the third appointed manufacturer of antiretroviral compounds for Brazil. The company also exports antiretroviral pharmaceuticals to 13 countries in Africa.<sup>147</sup>

#### **Xiamen Mchem Pharma Group Ltd.**

20F Sanjiang Bldg. 81 South Hubin Road  
Xiamen, Fujian 361004  
China  
www.mchem.com.cn

#### **Zhejiang Huahai Pharmaceutical Co. Ltd.**

Products: ddl. Zhejiang Huahai produces APIs and final formulations for both the domestic Chinese market and for export.

In June 2003, Huahai Pharma received approval from the Chinese government to produce didanosine (ddl) and ddl tablets (50mg & 100mg), the first ddl tablets to be produced in China under official authorization. Huahai reports that it will initially produce 200,000 tons of AIDS medications annually and expects to reach a total output of 500,000 tons under full capacity.<sup>148</sup>

**Zhejiang Huahai Pharmaceutical Co. Ltd.**

Xunqiao  
Linhai, Zhejiang 317024  
China  
www.huahaipharm.com

• **INDIA**

**Aurobindo Pharma Ltd.**

Products: ddl, EFV, IDV, 3TC, NFV, NVP, d4T, AZT; AZT/3TC, d4T/3TC; AZT/3TC/NVP. Active pharmaceutical ingredients (APIs): ddl, EFV, IDV, 3TC, NFV, NVP, ritonavir (r), saquinavir (SQV), d4T, AZT.

Aurobindo produces final formulations and is also one of the largest producers of active pharmaceutical ingredients in Asia. Aurobindo produces ARVs and APIs for both the domestic Indian market and for export. Product details are listed below.<sup>149</sup>

GENERIC NAME	BRAND NAME
ZIDOVUDINE 100 / 300	ZIDOVEX
LAMIVUDINE 100 / 150	LAMIVOX
DIDANOSINE 50 / 100	DIDAVEX
STAVUDINE 30/ 40	STAVEX
ZIDOVUDINE 300 + LAMIVUDINE 150	ZIDOVEX L
VUDINE 30/40 + LAMIVUDINE 150	STAVEX 30/ 40 L
ZIDOVUDINE 300 + LAMIVUDINE 150 + NEVIRAPINE 200	ZIDOVEX LN
STAVUDINE 30/40 + LAMIVUDINE 150 + NEVIRAPINE 200	STAVEX 30/40 LN
INDINAVIR 200 / 400	INDIVEX
NELFINAVIR 250	NELVEX
NEVIRAPINE 200	NEVIREX
EFAVIRENZ 200 / 600	VIRANZ

**Aurobindo Pharma Ltd.**

Registered & Corporate Office  
Plot # 2, Maitri Vihar, Ameerpet  
Hyderabad – 500 038  
Andhra Pradesh  
India  
www.aurobindo.com

**Cipla Ltd.**

Products: ABC, ddl, EFV, NVP, IDV, 3TC, d4T; 3TC/d4T, AZT /3TC, AZT/3TC/NVP, 3TC/d4T/NVP, ABC/3TC/AZT. APIs: EFV, 3TC, NFV, NVP, d4T, AZT. Cipla manufactures active pharmaceutical ingredients and final formulations for both the domestic Indian market and for export.

Founded in 1935, Cipla is one of three companies that is WHO pre-qualified to produce ARVs. Its annual revenues are about US\$350 million, with 65 percent of sales in India and 35 percent of sales abroad. Cipla produces ARVs for about 20,000 patients with sales of between US\$6-7 million a year and growing. The cost of the company's once-a-day combination kits range from US\$1-3 per day. In October 2003, Cipla was one of three Indian pharmaceutical firms to reach an agreement with the US-based Clinton Foundation to provide a triple-drug regimen for approximately 38 US cents per day in 13 African and Caribbean countries. In February 2004, Malaysia issued Cipla a compulsory license to supply ARVs, the first government to take such a step following the August 2003 WTO TRIPS agreement to waive patent claims in cases of public health crisis.<sup>150</sup>

**Cipla Ltd.**

Mumbai Central  
Mumbai 400 008  
India  
www.cipla.com

**Dr. Reddy's**

Products: APIs: 3TC, AZT.

Dr. Reddy's produces approximately 100 active pharmaceutical ingredients at six manufacturing facilities in India. It exports both finished products and APIs to the US, Europe, Australia, Africa and Canada, and recently established a research site in Atlanta, Georgia.

In 1994, Dr. Reddy's announced a plan to enter the HIV pharmaceutical market with an HIV diagnostic kit, following similar announcements from Lupin Laboratories and the Rajiv Gandhi Centre for Biology. The kit failed to reach production, and Dr. Reddy's has since only produced antiretroviral medications.<sup>151</sup>

**Dr. Reddy's**

7-1-27 Ameerpet  
Hyderabad - 500016  
Andhra Pradesh  
India  
www.drreddys.com

**Eastern Surgical Company**

Products: ABC, ddl, IDV, 3TC, NFV, NVP, d4T, AZT; 3TC/d4T/NVP, AZT/3TC.<sup>152</sup>

**Eastern Surgical Company**

3791, Daryanganj  
New Delhi, 110002  
India  
www.escoanand.com

**Emcure Pharmaceuticals**

Products: 3TC, NVP, d4T. Emcure produces ARVs in India and announced an agreement in January 2004 to export combination therapy to Kenya.<sup>153</sup>

## Emcure Pharmaceuticals

T-184  
MIDC Bhosari  
Pune, 411026  
India  
www.emcure.co.in

## Hetero Drugs Ltd/Genix Pharma Ltd

Products: ABC, atazanavir, delavirdine, EFV, IDV, 3TC, NFV, NVP, r, SQV, d4T, tenofovir, AZT; ABC/3TC/AZT, 3TC/AZT, 3TC/d4T, 3TC/d4T/NVP, 3TC/NVP/AZT; r/LPV. APIs: ABC, atazanavir, delavirdine mesylate, ddl, EFV, IDV, LPV, NFV, NVP, r, 3TC, d4T, tenofovir, AZT. Hetero produces ARVs and APIs (Genix produces finished formulations only).

In 2001, Genix Ltd introduced indinavir, the first indigenously made protease inhibitor in the Indian market. The company aims to build up a portfolio of market-oriented products that will reach a substantially large section of Indian population at affordable prices by 2005. Hetero Drugs, which works out of the same facility as Genix Pharma, offers an ARV drug cocktail for approximately US\$300 per year. It is one of three companies in Asia that is WHO pre-qualified to produce ARVs. Product details are listed below.<sup>154</sup>

Brand Name	Composition	Pack
ESTIVA 200/600	Efavirenz 200/600 mg	60 Cap/Bottle
NEVIVIR	Nevirapine 200 mg	60 Tab/Bottle 10 Tab/Strip
NEVIVIR - 2's	Nevirapine 200 mg	2 Tab/Strip
ABAVIR 100	Abacavir- 300mg	60 Tab/Bottle
HEPTAVIR 150	Lamivudine 150 mg	60 Tab/Bottle 10 Tab/Strip
STAG 30 Stavudine	30 mg	60 Cap/Bottle
STAG 40 Stavudine	40 mg	60 Cap/Bottle
ZIDO-H 100	Zidovudine 100 mg	60 Cap/Bottle
ZIDO-H 300	Zidovudine 300 mg	60 Cap/Bottle
INDIVIR	Indinavir 400 mg	180 Caps/Bottle 10 cap/Strip
NELFIN	Nelfinavir Mesylate 250mg	270 Tabs/Strip 10 Tab/Strip
RITOVIR	Ritonavir 100 mg Soft Gelatin Capsules	80 Caps
SAQUIN	Saquinavir 200 mg Soft Gelatin Capsules	60 Cap 10 Tab/Strip
ZIDOLAM	Lamivudine 150 mg + Zidovudine 300 mg	60 Tabs/Bottle 10 Tab/Strip
LAMISTAR 30	Lamivudine 150 mg + Stavudine 30 mg	60 Tabs/Bottle 10 Tab/Strip
LAMISTAR 40	Lamivudine 150 mg + Stavudine 40 mg	60 Tabs/Bottle 10 Tab/Strip
NEVILAST 30	Lamivudine 150 mg + Nevirapine 200 mg+ Stavudine 30 mg	60 Tabs/Bottle 10 Tab/Strip
NEVILAST 40	Lamivudine 150 mg + Nevirapine 200 mg +Stavudine 40 mg	60 Tabs/Bottle 10 Tab/Strip
ZIDOLAM-N	Lamivudine 150 mg + Zidovudine 300 mg	60 Tabs/Bottle 10 Tab/Strip

## Hetero Drugs Ltd/Genix Pharma Ltd.

Mr. M Srinivas Reddy  
Genix Pharma Ltd.  
H.No. 8-3-166/7/1  
Erragadda, Hyderabad - 500 018  
India  
www.genixpharma.net  
www.heterodrugs.com

## IPCA Laboratories Ltd

Products : 3TC, AZT.

IPCA operates in 93 countries globally with five wholly-owned foreign subsidiaries. It is the leading producer of anti-malaria drugs in India.<sup>155</sup>

## IPCA Laboratories

142 - AB, Kandivli Industrial Estate, Kandivli (West)  
Mumbai 400 067, Maharashtra  
India  
www.ipca.co.in

## Matrix

Products: Active pharmaceutical ingredients only: ABC, EFV, IDV, 3TC, LPV, NFV, NVP, r, SQV, d4T, AZT. Matrix produces APIs and intermediates for both the domestic Indian market and for export.

Matrix has more than 1300 employees, including 150 R&D scientists, and several of its plants have been approved by regulatory agencies such as US Food and Drug Administration and the Australian Therapeutics Goods Administration. In October 2003, Matrix announced an agreement with the US-based Clinton Foundation to provide bulk products for the three companies that will manufacture final formulations at highly discounted rates for 13 countries in Africa and the Caribbean.<sup>156</sup>

## Matrix Laboratories Limited

1-1-151/1, 4th Floor  
Sai Ram Towers  
Alexander Road  
Secunderabad – 500 003  
India  
www.matrixlabsindia.com

## Ranbaxy Laboratories Ltd

Products: ABC, ddl, EFV, NVP, IDV, 3TC, d4T; 3TC/d4T, AZT /3TC, AZT/3TC/NVP, 3TC/d4T/NVP, ABC/3TC/AZT. Ranbaxy produces active pharmaceutical ingredients and final formulations for both the domestic Indian market and for export.

The ninth largest pharmaceutical company in the world and the largest in India, Ranbaxy operates in more than 100 countries. The company is registered to export ARVs to approximately 35 countries and is awaiting registration in 20-25 other countries. Ranbaxy is one of three companies that are WHO pre-certified to manufacture anti-AIDS drugs. The company expects to generate revenues of US\$1 billion in 2004.

In October 2003, Ranbaxy was one of three Indian pharmaceutical firms to reach an agreement with the US-based Clinton Foundation to provide a triple-drug regimen for approximately 38 US cents per day in 13 African and Caribbean countries.<sup>157</sup>

**Ranbaxy Laboratories Ltd**

19 Nehru Place  
New Delhi-110019  
India  
www.ranbaxy.com

**Samarth Pharma**

Products: AZT.  
Founded in 1963, Mumbai-based Samarth Pharma supplies pharmaceuticals to the domestic Indian market and exports to South America, Europe, Africa and the rest of South Asia.<sup>158</sup>

**Samarth Pharma**

Samarth House  
Ram Mandir Road  
Goregaon (W), Mumbai 400-104  
India  
www.samarthpharma.com

**Strides Arco Ltd**

Products: IDV, 3TC, NVP, r, SQV, d4T, AZT; 3TC/AZT, 3TC/d4T, 3TC/d4T/NVP. Strides Arco produces final formulations only. It does not produce active pharmaceutical ingredients for other manufacturers.

Strides Arco has grown to become one of India's largest exporters of pharmaceutical formulations with over 350 product registrations in 49 countries. The company's annual sales totaled nearly US\$100 million in 2003-2004. Strides Arco operates eight plants in India, as well as several plants in North and South America. Several of its plants have received approval from government regulatory agencies in the United Kingdom, South Africa and Australia, as well as from UNICEF. Strides Arco is one of the few companies pre-qualified by WHO to supply drugs to the Global TB Drug Facility. The company recently signed a contract to provide ARV treatment for 20,000 patients per year. It has also formed partnerships with other global pharmaceutical companies in order to enter regulated markets. Product details listed below.<sup>159</sup>

Description	Dosage Form	Packing
Lamivudine 150mg	Tablet	60's HDPE Bottle
Zidovudine 100mg / 300mg	Tablet	60's HDPE Bottle 6 x 10's Blister
Stavudine 15mg/20mg/30mg/40mg/60mg	Capsule	60's HDPE Bottle
Nevirapine 200mg	Tablet	6 x 10's Blister
Indinavir 400mg	Capsule	120/180 HDPE Bottle
Lamivudine 150mg + Zidovudine 300mg	Tablet	6 x 10's Blister 60's HDPE Bottle
Lamivudine 150mg + Stavudine 30mg	Tablet	60's HDPE Bottle
Lamivudine 150mg + Stavudine 40mg	Tablet	60's HDPE Bottle
Lamivudine 150mg + Stavudine 30mg + Nevirapine 200mg	Tablet	60's HDPE Bottle
Lamivudine 150mg + Stavudine 40mg + Nevirapine 200mg	Tablet	60's HDPE Bottle
Saquinavir 200mg	Softgel capsule	180's Bottle
Ritonavir 100mg	Softgel capsule	84's HDPE Bottle

**Strides Arco Ltd.**

Strides House, Bilekahalli  
Bannerghetta Road  
Bangalore 560 076  
India  
www.stridesarco.com

**Sun Pharma**

Products: APIs only: EFV. Sun Pharma produces active pharmaceutical ingredients only. It does not produce final formulations of ARVs.

Founded in 1983, Sun Pharma is one of the five largest pharmaceutical companies in India. The company produces specialty bulk actives and formulations at its sites in India, several of which hold international regulatory approval.<sup>160</sup>

**Sun Pharma**

Andheri Kurla Road, Andheri (East)  
Mumbai 400 059  
India  
www.sunpharma.com

**Zydus Cadila Healthcare Ltd/Zydus Cadila Biogen**

Products: 3TC, AZT, 3TC/AZT. Zydus produces active pharmaceutical ingredients and final formulations for both the domestic Indian market and for export to countries in Africa and Asia, including Cambodia.

Ahmedabad-based Zydus Cadila exports 560 products to 43 countries worldwide. Zydus Cadila acquired the company in 2003 from Alpharma, one of the world's largest generic companies. Zydus Cadila reports that it is exploring the

possibility of establishing bases in markets such as Indonesia, South Africa, Brazil and Algeria, and aims to reach sales of US\$400 million by 2006.<sup>161</sup>

**Zydus Cadila Healthcare Ltd.**

Corporate Headquarters  
Zydus Tower  
Satellite Cross Roads  
Ahmedabad 380015  
India  
www.zyduscadila.com

• **INDONESIA**

**Kimia Farma**

Products: NVP; AZT/3TC. Kimia Farma produces final formulations only, importing active pharmaceutical ingredients from India and South Korea.

In January 2004, Kimia Farma received a license from the Indonesian Food and Drugs Supervisory Board to produce generic antiretroviral drugs for the domestic market. The company reports that it plans to produce 120,000 ARV packages per month (1,440,000 annually) to meet the demand for up to 2,000 people at a cost of approximately US\$60 per month.<sup>162</sup>

**Kimia Farma**

Kel Jatinegara- Kec Cakung  
Jl. Rawagelam V. Kaw. Industri Farmasi  
Jakarta Timur  
D.K.I. Jakarta  
www.kimiafarma.co.id

• **MALAYSIA**

**Duopharma**

Products: NVP. Information on API production and export unavailable.<sup>163</sup>

**Duopharma SDN BHD**

Lot 2599 Jalan Seruling 59, Kaw 3  
Taman Klang Jaya  
41200 Klang  
Selangor Darul Ehsan  
Malaysia / 3323-1566  
www.duopharma.com.my

• **SOUTH KOREA**

**LG Chemicals/LG Life Sciences**

Products: AZT. LG Chemicals/LG Life Sciences produces APIs and intermediates for export. Information on production of final formulations for the domestic Korean market is uncertain. South Korea's membership in the WTO prohibits companies from producing ARVs protected by patents. LG Chemicals is the leading chemical company in Korea with annual sales of KRW5.4 trillion and a global workforce of 10,000 employees, 1,000 of which are at LG Life Sciences.

**LG Chemicals**

Shanna Kim  
LG Twin Tower, East Tower  
20 Yoido-dong, Youngdungpo-gu, Seoul  
South Korea  
www.lgls.co.kr

**Korea United Pharmaceutical Inc.**

Products: AZT. Korea United produces APIs and intermediates for export. Information on production of final formulations for the domestic Korean market is uncertain. South Korea's membership in the WTO prohibits companies from producing ARVs protected by patents. Product details listed below.<sup>164</sup>

No	Category	Brand Name	Generic Name & Strength
188	Antibiotic & other Chemotherapeutics Agents	NITED-AZT Caps	1 Cap. Zidovudine 100mg

**Korea United Pharmaceutical Inc.**

154-8, Nonhyun-dong  
Kangnam-gu, Seoul  
South Korea  
www.kup.co.kr

**Samchully Pharmaceuticals**

Products: AZT. Samchully produces APIs and intermediates for export. Information on production of final formulations for the domestic Korean market is uncertain. South Korea's membership in the WTO prohibits companies from producing ARVs protected by patents.

Established in 1983, Samchully works with several leading pharmaceutical and biotechnology companies, including GlaxoSmithKline, Bristol-Myers Squibb, Avecia, and ISIS. The company first synthesized active pharmaceutical zidovudine in the 1990s. Product details listed below.<sup>165</sup>

Product Name	Ingredients	Dosage
Azidomine cap	zidovudine	100 mg

**Samchully Pharmaceuticals**

947-7 Daechi-Dong  
Gangnam-Gu, Seoul 135-735  
South Korea  
www.samchullypharm.com

• **THAILAND**

**Thai Government Pharmaceutical Organization (GPO)**

Products: ddl, 3TC, NFV, NVP, d4T, AZT; 3TC/d4T, 3TC/d4T/NVP. GPO produces final formulations for both the domestic Thai market and for export

The state-owned Government Pharmaceutical Organization under the Ministry of Public Health has approximately 2000 employees, manufactures 70 products and generated annual revenue of US\$98 million in 2003. GPO exports ARVs to

Cambodia, Africa and NGOs including Médecins Sans Frontières. ARV export revenue in 2003 totaled \$3 million, with a per person cost of triple combination therapy at approximately \$365 per year.<sup>166</sup>

#### **Thai Government Pharmaceutical Organization**

**75/1 Rama VI Rd.**

Ratchathewi

Bangkok, 10 400

Thailand

[www.moph.go.th/gpo](http://www.moph.go.th/gpo)

#### **T.O. Chemical**

Products: AZT. Information on API production and export unavailable.<sup>167</sup>

Contact information unavailable

### • **VIETNAM**

#### **MST Trading Pharmaceutical Co.**

Products: 3TC, AZT. Information on API production and export unavailable.<sup>168</sup>

MST is a private Vietnamese manufacturer based in Ho Chi Minh City. In December 2002, the company was awarded a contract by the government to provide lamizidivir, a combination of lamivudine and zidovudine. Pregnant women and health workers receive the treatment free of charge in Vietnam, but all others must pay the equivalent of US\$900/year for the medicine. MST has previously produced lamizidivir for export to South Africa, using APIs from South Korea.<sup>169</sup>

Contact information unavailable.

#### **Other Companies**

Other companies that may be producing ARVs or APIs include: Top Pharma (China)<sup>170</sup> and Vietnam Pharmaceutical Corporation.<sup>171</sup> Megah Pharma Pte Ltd. (Malaysia) imports generic ARVs for sale in the domestic market.

## Appendix 2

### TREAT Asia Site Information

To date, the following clinical centers, hospitals, and research institutions have participated in the planning and development of TREAT Asia:

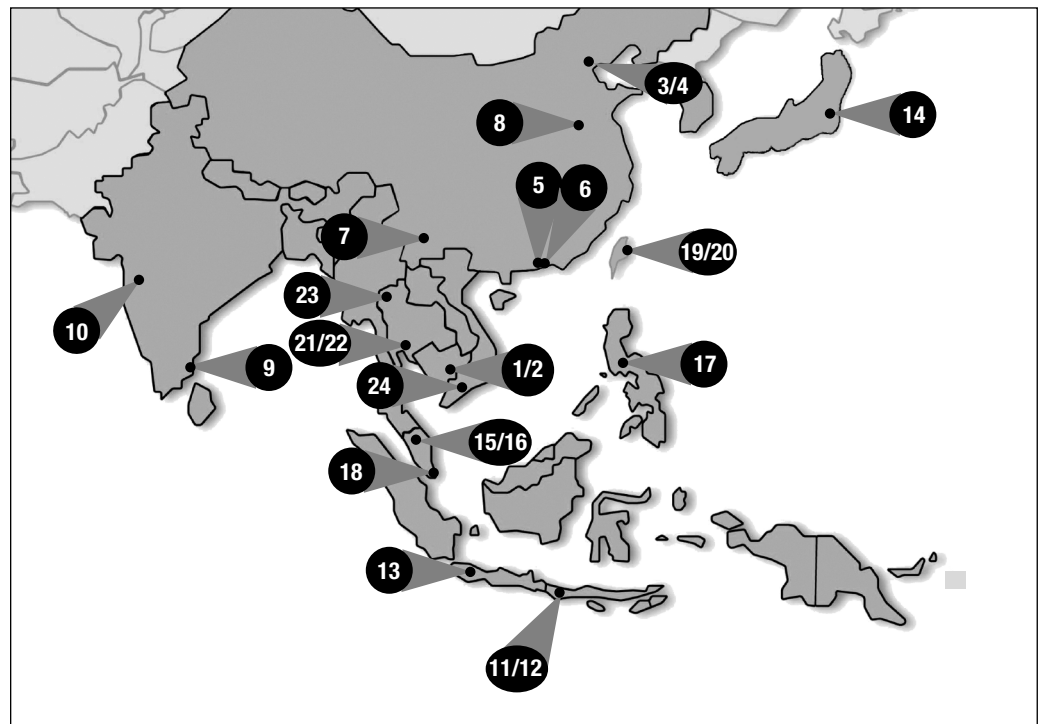
- |  |   |   |   |
|--|---|---|---|
| <p><b>1</b> National Center for HIV/AIDS, Dermatology, and STD<br/><b>Phnom Penh</b>, Cambodia<br/><i>Seng Sut Wantha, MD, MPH</i></p> <p><b>2</b> Preah Bat Norodom Sihanouk Hospital<br/><b>Phnom Penh</b>, Cambodia<br/><i>Senya Chhin, MD</i></p> <p><b>3</b> Beijing Ditan Hospital<br/><b>Beijing</b>, China<br/><i>Zhang Fujie, MD</i></p> <p><b>4</b> Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, <b>Beijing</b>, China<br/><i>Li Taisheng, MD, PhD</i></p> <p><b>5</b> Center for AIDS Control and Research, Municipal Health and Anti-Epidemic Station of Guangzhou<br/><b>Guangzhou</b>, China<br/><i>Chen Xiao Ping, MD, PhD</i></p> <p><b>6</b> Queen Elizabeth Hospital<br/><b>Hong Kong</b>, China<br/><i>Patrick C.K. Li, MBBS, FRCP</i><br/><a href="http://www.qeh.org.hk">www.qeh.org.hk</a></p> <p><b>7</b> Kunming Epidemic Hospital in Yunnan, <b>Kunming</b>, China<br/><i>Zhou Zengguang, MD</i></p> | <p><b>8</b> Infectious Disease Hospital of Zhengzhou<br/><b>Zhengzhou</b>, China<br/><i>Zhao Qingxia, MD</i></p> <p><b>9</b> YRG Centre for AIDS Research and Education<br/><b>Chennai</b>, India<br/><i>N. Kumarasamy, MD</i><br/><i>Suniti Solomon, MD</i><br/><a href="http://www.yrgcare.org">www.yrgcare.org</a></p> <p><b>10</b> HIV Project Ruby Hall Clinic<br/><b>Pune</b>, India<br/><i>Sanjay Pujari, MD</i><br/><a href="http://www.rubyhall.com">www.rubyhall.com</a></p> <p><b>11</b> Kerti Praja Foundation<br/><b>Bali</b>, Indonesia<br/><i>Dewa N. Wirawan, MD</i><br/><a href="http://www.ngo.or.id/ykpdps">www.ngo.or.id/ykpdps</a></p> <p><b>12</b> School of Medicine, Udayana University &amp; Sanglah Hospital<br/><b>Bali</b>, Indonesia<br/><i>Tuti Parwati Merati, MD</i></p> <p><b>13</b> School of Medicine, University of Indonesia &amp; Tjipto Mangunkusumo<br/><b>Jakarta</b>, Indonesia<br/><i>Zubairi Djoerban, MD</i></p> | <p><b>14</b> International Medical Center of Japan<br/><b>Tokyo</b>, Japan<br/><i>Shinichi Oka, MD</i><br/><a href="http://www.imcj.go.jp">www.imcj.go.jp</a></p> <p><b>15</b> University of Malaya Medical Center<br/><b>Kuala Lumpur</b>, Malaysia<br/><i>Adeeba Kamarulzaman, MBBS, FRACP</i><br/><a href="http://www.um.edu.my/FU/">www.um.edu.my/FU/</a></p> <p><b>16</b> Hospital Kuala Lumpur<br/><b>Kuala Lumpur</b>, Malaysia<br/><i>Christopher Lee, MD</i><br/><a href="http://www.hkl.gov.my">www.hkl.gov.my</a></p> <p><b>17</b> Research Institute for Tropical Medicine<br/><b>Manila</b>, Philippines<br/><i>Rossana Ditangco, MD</i><br/><a href="http://www.ritm.gov.ph">www.ritm.gov.ph</a></p> <p><b>18</b> Tan Tock Seng Hospital, Infectious Diseases Research Centre<br/><b>Singapore</b><br/><i>Nicholas I.J. Paton, MA, MD, MRCP, DTM&amp;H, FAMS</i><br/><a href="http://www.ttsh.com.sg">www.ttsh.com.sg</a></p> <p><b>19</b> Institute of Public Health &amp; AIDS Prevention and Research Center, National Yang-Ming University<br/><b>Taipei</b>, Taiwan<br/><i>Yi-Ming A. Chen, MD, ScD</i><br/><a href="http://www.ym.edu.tw/english/History.htm">www.ym.edu.tw/english/History.htm</a></p> | <p><b>20</b> Taipei Veterans General Hospital<br/><b>Taipei</b>, Taiwan<br/><i>Wing Wai-Wong, MD</i></p> <p><b>22</b> HIV-NAT/The Thai Red Cross AIDS Research Centre<br/><b>Bangkok</b>, Thailand<br/><i>Praphan Phanuphak, MD</i><br/><a href="http://www.hivnat.org">www.hivnat.org</a></p> <p><b>22</b> Ramathibodi Hospital<br/><b>Bangkok</b>, Thailand<br/><i>Asda Vibhagool, MD</i><br/><a href="http://www.ra.mahidol.ac.th">www.ra.mahidol.ac.th</a></p> <p><b>23</b> Research Institute for Health Sciences at Chiang Mai University, <b>Chiang Mai</b>, Thailand<br/><i>Thira Sirisanthana, M.D.</i></p> <p><b>24</b> Oxford University Clinical Research Unit at Hospital for Tropical Diseases, <b>Ho Chi Minh City</b>, Viet Nam<br/><i>Jeremy Farrar, FRCP, DPhil</i></p> |
|--|---|---|---|

#### Community Organizations

- Australian Federation of AIDS Organizations (AFAO)  
[www.afa.org.au](http://www.afa.org.au)
- Asia Pacific Council of AIDS Service Organizations (APCASO)  
[www.apcaso.org](http://www.apcaso.org)
- Asia Pacific Network of People Living with HIV/AIDS (APN+)  
[www.xs4all.nl/~gnp/asap.html](http://www.xs4all.nl/~gnp/asap.html)
- Action for AIDS (AFA)  
[www.afa.org.sg](http://www.afa.org.sg)
- AIDS Society of Asia Pacific

#### Advisory Group

- National Centre in HIV Epidemiology and Clinical Research, University of New South Wales, Sydney, Australia  
*David A. Cooper, MD, DSc*  
*Gregory Dore, MB, BS, BSc, FRACP, MPH*  
*Matthew Law, PhD*  
[www.med.unsw.edu.au/nchechr](http://www.med.unsw.edu.au/nchechr)





## Endnotes

- <sup>1</sup> UNAIDS. AIDS Epidemic Update. December 2003.
- <sup>2</sup> National Intelligence Council Report. The Next Wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China. September 2002.
- <sup>3</sup> Zhang F, MD. Beijing Ditan Hospital, Beijing, China. Cited in *Science*, 2004 June 4; vol 304.
- <sup>4</sup> Kumarasamy N, MD. YRG Centre for AIDS Research and Education, Chennai, India. Interview. June 1, 2004.
- <sup>5</sup> Bernard E. "Dublin Declaration Promises HIV Treatment for All in Eastern Europe & Central Asia by 2005." February 25, 2004. Available online at: [www.aidsmap.com/news/newsdisplay2.asp?newsId=2584](http://www.aidsmap.com/news/newsdisplay2.asp?newsId=2584).
- <sup>6</sup> AIDS Knowledge Base. International Epidemiology of HIV/AIDS. University of California, San Francisco. Available online at: [www.hivinsite.ucsf.edu](http://www.hivinsite.ucsf.edu).
- <sup>7</sup> National Intelligence Council Report. The Next Wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China. September 2002.
- <sup>8</sup> UNAIDS. Women in Mekong Region Faced With Higher Rates of HIV Infection Than Men. March 2004.
- <sup>9</sup> UNAIDS. Report on the Global HIV/AIDS Epidemic. 2002.
- <sup>10</sup> UNAIDS. Thailand: Epidemiological Fact Sheets on HIV/AIDS and Sexually Transmitted Infections. 2002 Update.
- <sup>11</sup> UNICEF. "Keeping Infants Safe in India." Real Lives. Available online at [www.unicef.org/infobycountry/india\\_2044.html](http://www.unicef.org/infobycountry/india_2044.html).
- <sup>12</sup> Prevalence estimates for China, Hong Kong, Japan, Laos, Malaysia, Philippines, and Singapore from: WHO. HIV/AIDS in Asia and the Pacific Region 2003; Prevalence estimates for Bangladesh, India, Nepal, and Thailand from: WHO. Estimated HIV prevalence and ART needs in SEAR. 2003.
- <sup>13</sup> WHO. HIV/AIDS in Asia and the Pacific Region 2003. Prevalence percentages use 15-49 year-old population in 2001 as the denominator.
- <sup>14</sup> Mean of estimates from: "Cambodia's Entry Could Be Panacea—or Bitter Pill." Inter Press Service. September 12, 2003. (170,000); WHO. HIV/AIDS in Asia and the Pacific Region 2003. (157,000)
- <sup>15</sup> Mean of estimates from: WHO. Estimated HIV prevalence and ART needs in SEAR. 2003. (130,000); Wirawan D, MD. Kerti Praja Foundation, Bali, Indonesia. Interview. June 3, 2004. (120,000)
- <sup>16</sup> Mean of estimates from: Marwaan M. "Finally, Those Living with AIDS in Laos Get Drugs." Inter Press Service. October 31, 2003. (1,400); WHO. HIV/AIDS in Asia and the Pacific Region 2003. (1,300)
- <sup>17</sup> Mean of estimates from: Beyrer C, MD. Johns Hopkins University. Interview. June 9, 2004. (675,000); WHO. Estimated HIV prevalence and ART needs in SEAR. 2003. (420,000)
- <sup>18</sup> Chen A, MD. Institute of Public Health & AIDS Prevention and Research Center, National Yang-Ming University, Tai Pei, Taiwan. Interview. May 22, 2004.
- <sup>19</sup> Mean of estimates from: Day J, MD. Hospital for Tropical Diseases, Ho Chi Minh City, Vietnam. Interview. June 9, 2004. (320,000); WHO. HIV/AIDS in Asia and the Pacific Region 2003. (130,000)
- <sup>20</sup> See Table 1 for sources of estimated total prevalence.
- <sup>21</sup> WHO. Estimated HIV prevalence and ART needs in SEAR. 2003.
- <sup>22</sup> Mean estimates of those needing and receiving ARVs from: AIDS Care Unit, National Center for HIV/AIDS, Dermatology and STD (NCHADS), Ministry of Health provided by Cortez, C. USAID. Interview. June 9, 2004. (need ARVs: 24,189; receiving ARVs: 3,389); Thim S. Cambodian Health Committee. Interview. June 11, 2004. (need ARVs: 20,000; receiving ARVs: 3,389)
- <sup>23</sup> Mean estimates of those needing and receiving ARVs from: Li T, MD. Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China. Interview. June 2, 2004. (need ARVs: 300,000; receiving ARVs: 10,000); The New York Times. "Two Nations Fight AIDS." November 23, 2003. (receiving ARVs: 5,000)
- <sup>24</sup> Li P, MD. Queen Elizabeth Hospital, Hong Kong, China. Interview. May 31, 2004.
- <sup>25</sup> Mean estimates of those needing and receiving ARVs from: Kochar S. International AIDS Vaccine Initiative (IAVI) India. Interview. June 9, 2004. (need ARVs: 458,000); Kumarasamy N, MD and Solomon S, MD. YRG Centre for AIDS Research and Education, Chennai. Interview. June 5, 2004 (need ARVs: 1,000,000; receiving ARVs: 12,000); Pujari S, MD. Ruby Hall Clinic, Pune. Interview. May 17, 2004. (need ARVs: 500,000-1,000,000; receiving ARVs: 20,000-30,000); WHO. Estimated HIV prevalence and ART needs in SEAR. 2003 (need ARVs: 600,000; receiving ARVs: 13,000)
- <sup>26</sup> Mean estimates of those needing and receiving ARVs from: WHO. Estimated HIV prevalence and ART needs in SEAR. 2003 (need ARVs: 18,400; receiving ARVs: 500); Wahyuni S. and Munniger. "Cheap Drugs for HIV/AIDS to Come in October." The Jakarta Post. September 2, 2003 (receiving ARVs: 1,000); Wirawan D, MD. Kerti Praja Foundation, Bali. Interview. June 3, 2004. (need ARVs: 6,000; receiving ARVs: 850-900)
- <sup>27</sup> Honda M, MD. International Medical Center of Japan, Tokyo. Interview. May 21, 2004.
- <sup>28</sup> MSF currently delivers ARVs to 40 people. Médecins Sans Frontières. MSF Activity Report 2002-2003. Available online at: [www.msf.org](http://www.msf.org).
- <sup>29</sup> Mean estimates of those needing and receiving ARVs from: Kamarulzaman A, MD. University of Malaya Medical Center, Kuala Lumpur, Malaysia. Interview. May 15, 2004. (need ARVs: 10,000; receiving ARVs: 2,000); Lee C, MD. Hospital Kuala Lumpur, Kuala Lumpur. Interview. May 15, 2004. (need ARVs: 8,000-10,000; receiving ARVs: 2,100)
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Therapeutics Research • Education • AIDS Training

# TREAT ASIA

Two Pacific Place Building  
17th Floor, Suite 1705  
142 Sukhumvit Road  
Klongtoey, Bangkok 10110  
Thailand

## Contact

### Kevin Robert Frost

*Vice President*

*Clinical Research and Prevention Programs*

*amfAR*

kevin.frost@amfar.org

### Stan Wong

*Program Coordinator*

*Global Initiatives*

*amfAR*

stan.wong@amfar.org

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**American Foundation for AIDS Research**  
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