

# The Curious Case of Cuba

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As health professionals in the United States consider how to focus health care and coverage to ensure better, more equitable patient and population health outcomes, the experience of Cuba's National Health System over the last 5 decades may provide useful insights. Although mutual awareness has been limited by long-term political hostilities between the United States and Cuban governments, the history and details of the Cuban health system indicate that their health system merits attention as an example of a national integrated approach resulting in improved health status. More extensive analysis of the principles, practices, and outcomes in Cuba is warranted to inform health system transformation in the United States, despite differences in political-social systems and available resources. (*Am J Public Health*. 2012;102:e13–e22. doi: 10.2105/AJPH.2012.300822)

There is a growing awareness in the United States that major changes in health care's conceptualization, organization, and delivery are needed if the country is to bring soaring medical costs under control and create a population health status commensurate with current evidence and technology.<sup>1</sup> The realities that 25 years of the approximate 30-year gain in life span in the 20th century are because of public health actions rather than clinical care<sup>2</sup>; that risk factors for chronic disease such as tobacco use, inappropriate diet, lack of exercise, and drug misuse are not easily addressed in clinical settings<sup>3,4</sup>; that many societal influences not traditionally included in medicine's purview can profoundly affect population health<sup>5,6</sup>; and that the United States is lagging behind other industrialized nations in population health outcomes<sup>6</sup> strongly suggest that a different approach is warranted.

Efforts in this direction have begun. A major impetus is the Patient Protection and Affordable Care Act (PPACA), which became law in March 2010. It includes significant funding for public health over the next decade, emphasis on prevention and wellness strategies, and incentives to develop partnerships among clinical and public health entities, governmental and nongovernmental alike, to improve health.<sup>7</sup> We suggest that lessons for maximizing the potential of the ACA and other significant efforts to improve our population's health

status can be found in the experience of Cuba, despite differences in our political-social systems and available resources.

More than 50 years of political enmity separating Cuba and the United States, complicated by a United States embargo prohibiting normal trade in food, medicines and medical equipment, and official programs aiming at regime change on the island, have made it difficult for Cuba's National Health System (NHS) and its outcomes to be thoughtfully considered by the United States media, the public, or policymakers. During the same decades, however, strategies were developed in Cuba that have resulted in consistent improvement in the population's health status, to the extent that today the country's health indicators resemble those of industrialized nations. In the words of Cooper et al.:

In virtually every critical area of public health and medicine facing poor countries Cuba has achieved undeniable success; these include most prominently – creating a high quality primary care network and an unequalled public health system, educating a skilled work force, sustaining a local biomedical research infrastructure, controlling infectious diseases, achieving a decline in non-communicable diseases, and meeting the emergency health needs of less developed countries.<sup>8(p818)</sup>

In this article, we do not advocate the United States adopt the Cuban system: the cultural, political, and socioeconomic differences are too great, and clearly each nation must find its own

path to health. However, we may draw from the principles and practices in Cuba to good end, and in particular we suggest the Accountable Care Community (ACC) concept as a viable model to apply such insights in our capitalist context.<sup>9</sup> In this light, we describe Cuba's health care conceptualization, delivery, and associated outcomes, and analyze how Cuban approaches to health might be tailored to our environment to improve both health care effectiveness and population health status.

## THE BEGINNINGS OF CUBA'S NATIONAL HEALTH SYSTEM

Cuban physicians were well trained and respected before Fidel Castro's rebel army overthrew the Batista regime in 1959, but health services and facilities were concentrated in the cities. Havana was home to almost half the country's physicians and contained more than half its hospital beds. The disparity between rural and urban health was marked. Cuba had only 1 rural hospital, only 11% of farm worker families drank milk, and rural infant mortality stood at 100 per 1000 live births.<sup>10–12</sup> The new government faced the immediate challenge of making good on its pledge to address rural poverty, illiteracy, and health disparities.<sup>13</sup> The 1959 agrarian reform distributed deeds to 150 000 landless farmers, and a 1961 United Nations Educational, Scientific and Cultural Organization lauded literacy campaign enlisted nearly 200 000 young volunteers who fanned out across the country, teaching some 700 000 to read and write.<sup>14,15</sup>

## Setting Overarching National Policy Goals

For their part, the newly organized health authorities began developing a single national public health system under the following principles, later enshrined in the 1976 Constitution adopted by national plebiscite<sup>16</sup> and the 1983 Public Health Law<sup>17</sup>:

- Health care is a right, available to all equally and free of charge.
- Health care is the responsibility of the state.
- Preventive and curative services are integrated.
- The public participates in the health system's development and functioning.
- Health care activities are integrated with economic and social development.
- Global health cooperation is a fundamental obligation of the health system and its professionals.<sup>17,18</sup>

**A National System for Universal Access**

Among the first issues tackled were to extend health services, train urgently needed professionals, and integrate fragmented health care delivery models into a single public system capable of responding to the most pressing health problems of the times. Thus, in 1960, the Rural Medical Service (RMS) was established, posting hundreds of newly graduated physician volunteers in remote areas over the next decade. By 1970, the number of rural hospitals had reached 53.<sup>19</sup> This was the beginning of ongoing efforts to distribute personnel and facilities according to health needs,

and a precursor of later models to embed health professionals in the communities they served and meld public health with clinical medicine. Part of the mandate of RMS physicians was to play a role as health and hygiene educators as well as clinicians.<sup>20</sup> During this period, national programs were also established for infectious disease control and prevention, targeting principally malaria, and acute diarrheal and vaccine-preventable illnesses.<sup>18,21,22</sup>

In 1976, health professionals' training was turned over to the newly established Ministry of Public Health (MINSAP, the Spanish acronym), which was given responsibility to define the knowledge base, competencies, and scope of responsibility for each of the university-level health sciences professions.<sup>23</sup> Provincial medical and nursing schools were also established to decentralize training and encourage professionals to practice in the regions where they grew up, in almost all cases in areas more underserved than the nation's capital. Another financial incentive was provided by free tuition, academic achievement being the sole prerequisite for admission.<sup>21</sup>

**More to Be Done for Community-Based Health**

By the mid-1970s, health services were available across the country and indicators began to improve (Table 1).

Yet, problems remained as patients reported that waiting times to see physicians were too long and time with doctors too short and superficial, preventive and curative services were not well integrated, coordination and continuity of medical care were inadequate, the system was still too hospital-oriented, and physicians preferred specialization over primary care. These findings led to the 1974 decision to create a new model of community-based polyclinics, locating essential primary care specialists such as obstetrics and gynecologists, pediatricians, and internists in virtually every Cuban community. Many clinics also included dental services. The point was to provide comprehensive care to residents where they lived.<sup>21</sup>

Policymakers reasoned that health and illness are influenced by the interaction of people with their environment, so health workers should understand not only the health status of their community, but also the biological, social,

**TABLE 1—Health Status Indicators: Cuba 1960, 1970, 1980, 1990, 2000, 2010; United States for Selected Years**

Health Status Indicator	Cuba						United States
	1960	1970	1980	1990	2000	2010	
Infant mortality (per 1000 live births) <sup>24</sup>	37.3 <sup>a</sup>	38.7	19.6	10.7	7.2	4.5	6.42 <sup>b</sup> (2009)
Infant mortality < 5 (per 1000 live births) <sup>24</sup>	... <sup>c</sup>	43.7	24.2	13.2	9.1	6.0	8.0 <sup>d</sup> (2010)
Life expectancy, <sup>24</sup> y	...	70.04	73.55	74.70	76.15	77.97	78.2 <sup>b</sup> (2009)
Low birth weight rate, <sup>25</sup> %	...	10.4 <sup>e</sup>	8.2	7.6	6.1	5.4	8.15 <sup>f</sup> (2010)
Sustained access to improved sources of drinking water, <sup>26</sup> %	...	...	...	78.2	90.3	94.5 <sup>g</sup>	...
Older adults (% of population ≥ 60 y) <sup>27</sup>	...	9.0	...	11.9	12.9	17.6	...
Infectious and parasitic disease mortality including AIDS deaths (per 100 000 inhabitants) <sup>28</sup>	...	45.4	10.1	9.6	6.6	8.0	...
Patient to doctor ratio <sup>i</sup> (inhabitants per physician) <sup>29</sup>	...	1393 <sup>h</sup>	641	274	170	147	390 <sup>j</sup> (2007)

<sup>a</sup>This figure is an estimate. The registries and records were not rigorous at the time.<sup>30</sup>

<sup>b</sup>This number for the United States comes from a different source.<sup>31</sup>

<sup>c</sup>This indicator was not recorded at that time.

<sup>d</sup>This number for the United States comes from a different source.<sup>32</sup>

<sup>e</sup>The number for 1970 comes from a different source.<sup>33</sup>

<sup>f</sup>This number for the United States comes from a different source.<sup>34</sup>

<sup>g</sup>The number for 2010 comes from a different source.<sup>35</sup>

<sup>h</sup>The number for 1970 comes from a different source.<sup>36</sup>

<sup>i</sup>Range in 2010 among provinces = 103–219.

<sup>j</sup>This number for the United States comes from a different source.<sup>37</sup>

cultural, and economic factors that affect it. This was an early recognition of the importance of the social determinants of health. Medical school curricula were redesigned, residency training programs were revised, and polyclinics were included as teaching sites, as primary health care became the lynchpin of the emerging national system.<sup>18,21</sup> These efforts were accompanied by establishment of 4 main national programs, designed as both guides to practice and yardsticks for measuring success in improving population health: maternal and child health, infectious diseases, chronic noncommunicable diseases, and older adult health.

As the 1970s transitioned to the 1980s, Cuba also began giving higher priority to tertiary care facilities and research, expanded accreditation of medical specialties to 55 fields, established national institutes as centers of excellence, initiated and quickly accelerated investment in biotechnology, developed national programs for prenatal screening, established an organ transplant program, and installed the first nuclear magnetic resonance equipment in Latin America.<sup>21,22</sup>

Taken together, these changes broadened health coverage, boosted the technical capacity of the system, and resulted in more efficient health care delivery, creating an improved health status. Cuba's health indicators transitioned from those typical of a developing country to those more typical of the developed world. Nevertheless, patients reported that specialists' services were not coordinated by a primary care doctor, so continuity of care was problematic, emergency departments were overutilized, and preventive and curative care remained inadequately integrated.<sup>18,21</sup> The stage was set for the next major realignment of Cuba's NHS.

### Family Physician and Nurse Program

In the early 1980s, Cuban health officials decided their country would become the first in the developing world to cover the health needs of every citizen founded on comprehensive family practice.<sup>18,21,38–41</sup> Cuba was by then an aging society with morbidity and mortality concentrated in an adult population plagued by chronic ailments, such as heart disease, cancer, and diabetes, rather than in children or infectious diseases.<sup>30</sup> Control of

such chronic conditions requires both medical care and long-term prevention strategies, particularly in a society with limited resources.

The decision was made to provide individuals, their families, and neighborhoods with a team of practitioners that would both coordinate medical care and lead health promotion efforts based on evidence gathered about the specific health problems faced by the population in their geographically determined catchment area. In 1983, the Family Doctor and Nurse Plan was piloted in a blue-collar Havana community, with the local polyclinic serving as the hub for some 15 teams posted in the surrounding neighborhoods. The resulting success led to the program's nationwide extension and development of a new specialty pursued in a postgraduate residency program: Comprehensive General Medicine (family medicine).<sup>23,42–44</sup>

In effect, the principles of public health and clinical medicine were combined into a single professional duo emphasizing prevention and epidemiologic analysis with improvement of individual and population health outcomes as the central purpose.<sup>23</sup> The following objectives for family doctor and nurse teams illustrate the melding of medical and public health activities in their practice:

- Promote health through positive changes in the population's knowledge, sanitary habits, and lifestyle.
- Prevent the emergence of diseases and damage to the population's health.
- Guarantee early diagnosis, ambulatory services, and hospitalization, as well as timely, continuous, and comprehensive medical care in the community.
- Develop community-based rehabilitation for physically or psychologically disabled persons.
- Achieve improvements in neighborhood environmental clean up and in home hygiene.
- Achieve improvements in social relations and integration of neighborhood residents and families.
- Develop studies that respond to the health needs of the population.<sup>43</sup>

Although addressing lifestyle and social determinants of health, the new model also facilitated a clinical "technology triage," with

primary care professionals relying first on history-taking and clinical skills, reserving costly high-tech procedures and institutions for patients requiring them.<sup>45</sup> Planners also sought to counteract the dehumanization that tends to occur with proliferating technology and superspecialization.<sup>18,38</sup>

Family physician and nurse teams were assigned to live in the neighborhoods where they practiced, literally next door to their patients. Originally, each team was responsible for improving and maintaining the health status of 600 to 800 people (120–150 families) in their catchment area, generally holding office hours in the morning and reserving the afternoon for house calls.<sup>21,23,39,41,46,47</sup> More recently, warranted by improving health outcomes and with thousands of family physicians serving abroad, teams now can be responsible for up to 1500 people. In rural areas, the patient numbers are closer to the original concept to preclude the necessity for rural citizens to travel long distances to the family medicine office.<sup>48</sup> Family doctors and nurses have also been stationed in large factories and schools, on board ships, child-care centers, and homes for senior citizens, among other settings.<sup>23</sup>

Although remaining doctor-centered by all accounts, the role of the nurse in this team is a defining feature: the nurse usually spends years serving in the same neighborhood, whereas physicians may either do the same or rotate out after their family medicine residency is completed. Thus, the nurses are the glue that keeps this duo closer to the needs of the families and individual residents.

### Strengthening the Curriculum

As a result of the family medicine model, the medical and nursing curricula received their greatest overhaul yet, adjusting to emphasize the expectation that Cuban family physicians and nurses would be responsible for the health of their patients, not just the treatment of disease and injury. This new curriculum was designed to match graduates' professional competencies with the NHS's workforce needs and the population's health needs, incorporating skills to understand and act upon shifting population health profiles. Curricular changes included the following:

- increased proportion of epidemiological and public health sciences (including social communication),
- emphasized service learning in the community,
- introduction of problem-based and other active learning methods, and
- introduction of clinical skills early in training with the basic medical sciences.<sup>23</sup>

## CUBA'S CURRENT NATIONAL HEALTH SYSTEM

By 1999, full population coverage was achieved by the teams, their numbers continuing to grow even during the decade-long economic crisis in Cuba triggered by the collapse of the Soviet Union in 1989.<sup>47</sup> By the new millennium, data showed the impact of universal primary care on hospitals, decongesting the latter's outpatient and emergency services (Table 2).

Today, when visiting family medicine offices in Cuba, a physician and nurse team (usually mentoring medical and nursing students as well) can be found working out of a simple government-built structure. These are 2 stories with living quarters on the second floor for either the doctor or the nurse and family (a way to provide 24-hour availability), and a first-floor medical facility comprising a waiting room, small office, and examining room, plus storage space. Team activities are guided by 2 processes used to organize and deliver

comprehensive prevention and clinical care: the neighborhood health diagnosis and the Continuous Assessment and Risk Evaluation (CARE or *dispensarizacion* in Spanish) method.<sup>43,47</sup>

### Neighborhood Health Diagnosis

Cuba's NHS is a socialized system. Almost all facilities are government owned and operated, and almost all professionals are government employees. The health institutions are guided methodologically by MINSAP, but supervised by community, municipal, provincial, and national governments, depending on the jurisdiction of the institution. The system's principles, policies, and procedures are centrally developed, but local flexibility is required to respond appropriately to particular health circumstances extant in each geographic area served by community polyclinics and their family medicine teams. The required neighborhood health diagnosis is the key to establishing localized work priorities for the family medicine team and nationwide consistency generated through MINSAP-established guidelines. The analysis of diseases, risk factors, and environmental influences on health must be updated twice yearly, its findings used to set local priorities for health promotion, disease prevention, diagnosis and treatment, and rehabilitation activities. Much of the information contained in the analysis is gleaned from the team's patient records, completed by hand.<sup>47</sup>

In the family doctor offices visited by the authors, information about each patient is kept in family histories, with separate sections for each member. In each case, the individual's demographics, risks to health, and diagnoses are noted. The histories are updated as new information is acquired, providing a basis for individual patient preventive or curative initiatives, and for aggregated information useful in understanding the community's health status and particular needs. This information also becomes part of the statistical data fed into the national system through data reported to the local polyclinic.

### Continuous Assessment and Risk Evaluation

The CARE process was adopted as a way to ensure that information from the patient's medical history, physical examination, home environment, and neighborhood characteristics could be used to both monitor and affect the health of individuals and families. Residents are classified by disease and risk factors: smokers, overweight, diabetic, hypertensive, etc. This is a tedious and time-consuming process accomplished family by family, but is essential to intervention plans to promote health by modifying risk factors and applying appropriate Western and integrative medicine therapies for identified health problems. Family physicians and nurses are required to make annual home visits to each family in their catchment area, and patients with chronic illnesses are seen a minimum of once every 3 months.<sup>47</sup>

Family physicians regularly call upon other primary care specialists, based at their community polyclinic, to consult on specific cases, its physicians referring patients to hospital services when required. Family physician and nurse offices and polyclinics alike undergo evaluation to become accredited as teaching facilities. There are currently 488 polyclinics across the country, each serving a population between 20 000 and 60 000.<sup>48,51</sup> Thus, patients and students move up and down the system shown in Figure 1.

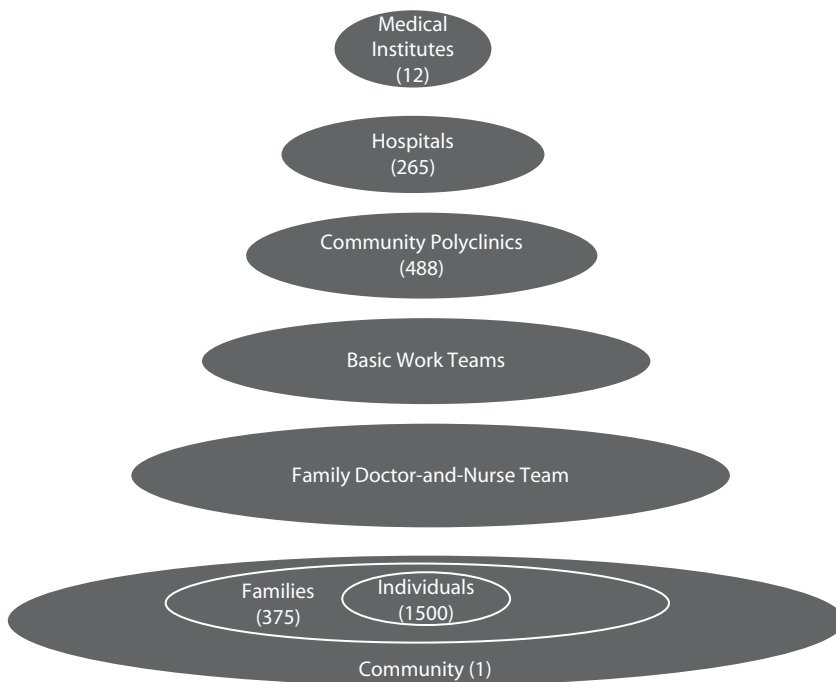
Supervision for family physician offices is also centered in the polyclinics, each clinic supporting some 20 to 40 family physician and nurse teams. "Basic Work Groups" composed of a leader from the polyclinic, a nursing

**TABLE 2—Doctor Visits by Type of Institution in Cuba, 1970, 1980, 1995, 2000**

Type of Unit	1970, No. (%)	1980, No. (%)	1995, No. (%)	2000, No. (%)
<b>Outpatient visits</b>				
Hospital <sup>a</sup>	5 292 181 (24.6)	6 518 669 (21.7)	8 641 810 (15.2)	8 901 448 (14.7)
Polyclinic/primary care	14 973 670 (69.6)	21 962 705 (73.2)	47 593 170 (83.6)	51 345 212 (84.5)
Other	1 238 761 (5.8)	1 518 791 (5.1)	680 875 (1.2)	462 088 (0.8)
Total	21 504 612 (100.0)	30 000 165 (100.0)	56 915 855 (100.0)	60 708 748 (100.0)
<b>Emergency visits</b>				
Hospital <sup>a</sup>	6 255 291 (80.2)	12 160 548 (80.2)	11 407 650 (62.6)	8 589 865 (43.3)
Polyclinic	1 474 201 (18.9)	2 870 210 (18.9)	6 620 364 (36.4)	11 123 164 (56.1)
Other	65 949 (0.9)	134 700 (0.9)	185 632 (1.0)	122 077 (0.6)
Total	7 795 441 (100.0)	15 165 458 (100.0)	18 213 646 (100.0)	19 835 106 (100.0)

Source. Ministry of Public Health (Cuba).<sup>49,50</sup>

<sup>a</sup>Includes tertiary institutes.



Source: Demers et al.<sup>44</sup>

**FIGURE 1—The Cuban Health Pyramid.**

supervisor, an internist, a pediatrician, an obstetrician-gynecologist, a psychologist, and in many cases a social worker have responsibility for a specified number of family doctor and nurse offices. The groups are responsible for reviewing that office's neighborhood health analysis and health status, as well as the performance evaluation of the doctor and nurse.<sup>47</sup>

The radical shift represented by the adoption of the family doctor and nurse program was summarized in a United Nations Development Program (UNDP) published study as early as 2000:

This (the Family Doctor and Nurse Program) has been the most important reform carried out in the National Healthcare System, and it has become the pillar of primary care. The objective of this model has been to improve the health situation of the population through comprehensive actions involving individuals, families, communities and the environment.<sup>52(p99)</sup>

### Community Support

Family doctor and nurse teams are an integrated part of their neighborhoods, where their work is both supported and evaluated by

community members, primarily through the Popular Councils, the most grassroots level of the Cuban government. Additionally, neighborhood organizations are important resources for family physicians when it comes to organizing health education opportunities, vaccination campaigns, mosquito control, and the like. They also provide feedback to health authorities about the competence of the medical team(s) they work with.<sup>21,47</sup>

### Other Specialty Services

The first line of specialty service provision is the polyclinic. In addition to physician specialists, polyclinics offer more advanced laboratory testing, diagnostic procedures, dentistry, and rehabilitation services. Also included at the primary care level are services such as the 336 maternity homes for women with high-risk pregnancies and 234 senior day care facilities. The next service tier is provided by municipal hospitals. Above this level are the tertiary care specialty hospitals at the provincial level and 14 institutes, the latter carrying out research as well as clinical care in a specific field. All provinces have at least 1 general, 1 maternity,

and 1 pediatric hospital, and most have more. In all, Cuba has 215 hospitals, the fewest (4) in Cienfuegos Province (with a population of 406 000). Havana, with a population of 2.2 million, has 45 hospitals.<sup>24</sup>

### Results of Universal Access to Preventive Care

Cuba's NHS, founded on strong primary health care, has been effective in application of clinical preventive services. Few can match Cuba's record of 98% full immunization by the age of 2 years, vaccinating children against 13 illnesses<sup>53</sup>; antenatal care for 95% of pregnant women by the end of their first trimester with rates of infant mortality less than 5 per 1000 births; and chronic disease control, including at least yearly blood pressure measurements for almost the entire population.<sup>47</sup> In addition, by the mid 1980s, Cuba implemented the universal access to primary care that the world's governments agreed was essential to achieve "Health for All," the goal enunciated at the 1978 International Conference on Primary Care in Alma Ata.<sup>54</sup> More recently, Cuba was ranked near the top of those countries on course to meet the United Nation's Millennium Development Goals, which focus more on the social determinants of health.<sup>55</sup> The organization "Save the Children" lists Cuba as the best place among their Tier II Less Developed Countries for motherhood.<sup>56</sup>

### Data Collection and Evaluation

Cuba has a fairly robust national health data collection and analysis capability, centered in its National Statistics Division, which gathers data from all levels of the health system, beginning with the family medicine offices. The Division is complemented by an active Health Tendencies Analysis Unit (UATS, the Spanish acronym), which uses a 3-pronged approach. Its Action Alert System uses various surveillance techniques to provide early warning and response to population health hazards. UATS also provides strategic analysis of epidemiological data from the national, provincial, and municipal level to elucidate disease patterns and predict disease behaviors to develop and prioritize intervention strategies. Its third area of activity is the evaluation of health outcomes to determine the success of interventions.<sup>57</sup>

## CONTINUOUS EVOLUTION

Of the major factors that have driven change in Cuba's NHS over time, 2 are relevant to our discussion here.

### Drive for Continuous Improvement

The first is the continuing drive to improve the country's health status, a factor 1 of the authors has called the "historic dynamic of dissatisfaction that has propelled Cuba's health movement over the years. . . ." <sup>58(p5)</sup> It is a drive that is singularly focused on continually asking and answering the same policy question: "What can be done now, given our limited resources, to further improve health status?"

Changes thus motivated can be instituted from the top down or from the bottom up, and they indicate the kind of flexibility and agility that characterizes the system. An example of a change instituted from the top down was the complete restructuring of the National Cancer Program in 2006–2007, mandating creation of a new National Cancer Unit with authority over all program implementation, from prevention through treatment, rehabilitation, and cancer medication development. This was prompted by a review indicating that many types of cancer morbidities and mortalities were showing significant increases. <sup>59</sup>

As a bottom-up example, there are the lobbying efforts of HIV/AIDS patients, their families, and physicians for change in a national policy that had obliged all diagnosed patients to live in a sanatorium. As a result of the presentation of evidence that many of these patients not only wanted to return to their jobs and families, but were also likely to survive longer as Cuba applied antiretroviral therapy, MINSAP was persuaded to change this policy in 1993. Patients were offered the option of ambulatory care once they understood how to prevent transmission of the disease, and neighborhood family physicians were given further training to provide primary care for these patients once they were back home. <sup>60,61</sup>

The same creativity in "facing the facts" is being applied to a number of current challenges. Cuba has made steady progress in the reduction of infant mortality, now achieving a rate of less than 5 per 1000 live births, an accomplishment comparable to the

industrialized world. Maternal mortality has also improved and reached 43.1 per 100 000 live births—a rate that, although less than half the rate for Latin America and the Caribbean, is far higher than it should be. This reality has led to a national review of protocols for care, facilities, human resources, and preventive approaches aimed at a significant reduction in maternal mortality. <sup>62</sup>

### Limited Resources

A second important factor is the reality of very limited resources. Cuba is a poor country with a gross domestic product less than US \$48 billion annually. Despite the political commitment to health demonstrated by its government over the last 50 years, its economic limitations have significant policy and performance impact. On the positive side, limits in resources for chronic disease treatment have made a heavy focus on prevention both smart and prudent. On the negative side, the collapse of the Soviet Union, which forced a contraction of the Cuban economy by 35% in the 1990s, the continuing United States embargo, and the recent worldwide recession have contributed to both governmental and individual hardship. <sup>63</sup> Modernization of hospitals and other facilities has been slowed, health worker salaries have remained low and stagnant, and acquisition of equipment and materials is behind schedule.

Despite these factors, a continued priority on health has resulted in steady improvements to date, punctuated by temporary setbacks in some indicators immediately after the Soviet Union's demise. The early 1990s witnessed a short-term resurgence of infectious diseases, small increases in infant and maternal mortality in 1994, and an epidemic in 1992–1993 of optic and peripheral neuropathy, probably because of vitamin deficiencies that affected approximately 50 000 people before it was brought under control. Even during those difficult times, the government continued to prioritize health and social spending. <sup>47</sup>

## CHALLENGES AND OPPORTUNITIES AHEAD

The main challenge facing Cuba continues to be how to do even more with still less as the impact from the global recession and US

embargo is manifested. In addition, the aging population, 17.4% of whom were older than 60 years in 2009, will put a greater burden on health services, especially those addressing chronic conditions, including rehabilitation. <sup>64</sup> On the positive side, revenues are expected from more exports of biotechnology products and from medical services provided abroad. Cuba's more than US \$1 billion investment in its pharmaceutical and biotech industry is now paying off; innovative vaccines, diagnostic kits, and therapeutics are provided first to meet national needs, and then registered and marketed internationally. These sales, coupled with income from joint ventures with firms in countries such as Great Britain, Canada, Brazil, China, and India reached an annual level of US \$300 million by 2005. <sup>65</sup> Internationally, Cuba provides medical services without charge to the poorest of countries seeking assistance, and paid medical services to others, in a program that is already earning valuable hard currency and is expected to expand. Altogether, Cuba has over 35 000 medical workers serving in more than 70 countries, providing care for some 70 million people. <sup>66</sup>

The NHS is currently immersed in a thorough analysis of all health care levels with the intent of increasing effectiveness and efficiency, using limited resources to reconfigure services as necessary to achieve better patient-centered and population health outcomes. <sup>48</sup>

Most important for primary care, Cuba's highly educated population is ripe for more intersectoral programs on prevention, lifestyle changes, etc. The challenge will be to successfully incorporate "health in all policies"—a challenge shared by countries the world over. However, Cuba, with its robust system and priority on primary care, may have a head start. Cuba's success, even in the worst of times, is well described by the UNDP-sponsored report, issued in 2000:

An evaluation of 25 countries in the Americas measuring relative inequalities in health revealed that Cuba is the country with the best health situation in Latin America and the Caribbean. It is also the country which has achieved the most effective impact with resources, though scarce, invested in the health sector. <sup>52(p103)</sup>

## LESSONS FOR THE UNITED STATES

The Cuban experience is an instructive one, particularly for poor countries that face

daunting health problems with limited resources. The United States might also learn from Cuba's NHS and apply some of its principles to this country's market-driven health care system. Some of these principles include the following, in order of priority.

### Set an Overarching Health Policy Goal

Since the 1980s, the Department of Health and Human Services has led a collaborative process to set evidence-based 10-year measurable national health promotion and disease prevention objectives known as the "Healthy People" series, the most recent iteration named *Healthy People 2020*.<sup>67</sup> Results have been mixed at best. The effort is clearly a call to action for health professionals and communities, but comes in the absence of a clear national policy priority to focus resources on health status improvement or financial incentives for clinical settings to pursue prevention aggressively, or the existence of a national health system that can be directly tasked with addressing such defined objectives. Rather, much of the impetus has been focused on state and local health departments, which are generally underfunded with little capacity to take on the issues described at the scale required for real improvement.

The passage of the ACA, with its focus on health promotion and disease prevention, is an important effort to reorient the financial incentives that drive provider activities toward the improvement of health outcomes. The Accountable Care Organization (ACO) provision in the ACA is a first step toward the collaboration among providers, agencies, and institutions that is essential to success. This model asks providers to take on the risk of managing the health care costs of a Medicare population with the promise that they will be able to share any savings as long as health care quality does not diminish.<sup>7</sup> This proposal, along with others contained in the health care reform law, is hampered by its application to only those populations whose care is financed by the federal government (Medicare and Medicaid).

It is unlikely the United States will soon adopt a national health policy goal to match Cuba's, but by expanding the ACO concept to that of an ACC, it may be possible to achieve

such an intent at the local level that includes all community residents in a prevention-oriented health system. The ACC concept under development in Summit County, Ohio defines itself as

a collaborative, integrated and measurable multi-institutional approach that emphasizes shared responsibility for the health of the community, including health promotion and disease prevention, access to quality services, and healthcare delivery.<sup>9(p6)</sup>

This model, and others like it,<sup>68</sup> provide a mechanism to apply a community-wide approach even in the absence of federal requirements to do so.

### Integrate Public Health Into Clinical Medicine

This may be the intent of the new US National Prevention Strategy, with its goal to increase the number of Americans who are healthy at every stage of life. The strategy includes 4 evidence-based strategic directions that will require active engagement by all sectors of society to accomplish the following:

1. expand quality preventive services in both clinical and community settings,
2. eliminate health disparities,
3. empower people to make healthy choices, and
4. build healthy and safe community environments.<sup>69</sup>

These strategic directions coincide with the policy directives of the Cuban NHS and the intent of the ACC. A theoretical construct that might be considered by communities in this country to address these strategic directions and approximate the activities of Cuban health professionals and their communities includes the following:

- Local health departments supporting the patient care roles of hospitals, Federally Qualified Health Centers, and other clinical providers (see directions 1 and 2). Assuming the expansion of access to care for currently excluded individuals continues, many local health departments forced in the past to fill access-to-care gaps by providing primary care clinics, well baby clinics, antenatal care clinics, etc., will see the need for those services begin to disappear. Soon to be

underemployed public health nurses and other public health workers might well be reassigned to work with neighborhoods or other subpopulation groups to enhance involvement with primary care providers by emulating the Cuban primary care nurse. Activities would include helping patients to keep appointments for clinical preventive services, identifying members of the community with special needs, and getting them involved in care, assisting with community health needs assessments, etc.

- Community agency collaboration to provide community-based health behavior modification services (see direction 3). In general, clinical providers are minimally effective at getting patients to stop smoking, lose weight, exercise more, reduce substance dependence, and so on. Many agencies including health departments, mental health agencies, the American Heart Association, the American Diabetes Association, the American Lung Association, Planned Parenthood, etc., provide opportunities to attempt such behavior changes. Not uncommonly, however, these opportunities are episodic and not well coordinated. Communities should challenge these groups to combine their resources to develop a behavior modification center that would act as a science-based single referral source for clinicians with patients in need of such services or for individuals acting on their own. Physicians would be incentivized to call the attention of their patients to the need for behavior change, and would have a reliable source of referral that would be little different in its function from a referral to any specialty service. Such an effort should have a governing board with representatives from all agencies involved and the population served.
- Use the power of the collaborative consortium to include the impact on health of decisions made by public policy makers in all venues of the community (see direction 4). An effective ACC or similar organization would monitor the local impact of the determinants of health and establish consortium objectives related to them, assuring that expert testimony was available for city or county council meetings, planning commission meetings, etc., in an effort to create a healthful environment in all parts of a community.

### Provide Universal Access at Little to No Out-Of-Pocket Cost

It is not to be expected that the United States (with the exception of the Veterans Administration) would adopt a socialized approach to health services like that of Cuba's. The failure of efforts to include a so-called "public option" in the ACA suggests that we are also not yet willing to accept socialized payment systems beyond Medicaid and Medicare. Nonetheless, without the universal access that is the backbone of the Cuban system, it is unlikely that we will be able to match the health status of the rest of the developed world. Although a single-payer system would likely be the most cost-efficient approach to expanded access, strong national regulation of a private insurance system available to all, the approach favored by the ACA, might also be a reasonable approach to assuring access at an affordable cost.<sup>70</sup>

In the absence of a national or state solution, an ACC might well be able to develop a local solution built on the model so well exemplified by "Project Access" in Buncombe County, North Carolina, which enlists local physicians and hospitals to participate in a preventively oriented volunteer medical service program for almost every community resident without health coverage. The program, run by the local medical society, distributes care for such patients evenly to participating physicians. Primary care physicians agree to accept 10 to 12 patients and specialty physicians 20 to 24 patients annually. Positive health status outcomes have been impressive with the uninsured covered by this program more likely to report better health than the insured population. Many other communities across the country are adapting "Project Access" to fit their own particular environment.<sup>71</sup>

### Evaluate Process and Outcomes Regularly and Rigorously

A robust health information infrastructure is key to success of both the Cuban and the ACC approach to improving community health status, not only because of the maxim that what gets measured gets done, but also because the capacity to demonstrate advances in community health status is central in this country to distributing financial incentives to providers who are successful at reducing costs and improving health outcomes in populations. In

addition to measuring outcomes against local goals set after completing a community health assessment, ACC's goals should measure their progress against the Healthy People 2020 objectives. This would begin the process of communities accepting responsibility for making a contribution to national goals.

### Improve Integrated Teaching in All Health Professions

These subjects were often omitted from health professions curricula in the past, and it remains difficult in most settings to secure the time and resources required for effective integration of this content. Fortunately, there is growing recognition that health professions teaching must improve in this regard. The Healthy People Curriculum Task Force<sup>72</sup> developed a Clinical Prevention and Population Health Curriculum Framework in 2004, which was revised in 2009.<sup>73</sup> The framework is useful for all health professions training, and some progress has been made in utilizing it,<sup>74</sup> although the framework has not been widely adopted in core curricula.<sup>75</sup> In our view, it should be a requirement of health professions curricula that students engage in meaningful ways with communities, and we would argue that if every community had an ACC, every health professions school would need to engage with community-based agencies. It might be less intimidating at that point for these schools to accept some level of responsibility for their community's health in their strategic plans.

### Draw More Medical Students From Disadvantaged Communities

Central to the Cuban model of medical education is to find and enroll qualified students from the communities where they grew up, and the need is great because they tend to be more highly motivated to live and work there upon graduation. The United States is facing a physician shortage and is expanding medical school numbers and class sizes to compensate. However, these efforts are proving insufficient to ensure enough medical doctors who will practice in primary care settings, especially in underserved areas, and who are able and willing to work in teams to help ensure improved population health outcomes. With an average medical student debt at

graduation of about \$158 000, the numbers of poor and minority students are diminishing, and graduates are incentivized to seek high-paying specialties.<sup>76</sup> The current Association of American Medical Colleges' review of admissions processes and requirements with the aim of increasing medical student diversity is to be commended, but its impact is likely to be minimal in the absence of public policy to subsidize the professional education of deserving but poor students. This is a policy decision that could be made at the national level with relative ease by requiring, for example, that medical schools receiving National Institutes of Health funding provide full tuition support for a specified number of financially disadvantaged students.

### CONCLUSIONS

The Cubans found a way, in their own particular environment, to apply with great success a body of knowledge generally known in other countries where application has been difficult or impossible for a variety of political, socioeconomic, and cultural reasons. We believe it is possible for us to apply many of the principles effectively demonstrated in Cuba, using mechanisms and incentives in our market economy to induce changes resulting in health improvement. We also believe that increasingly healthy communities with lower health care costs will be more successful in attracting businesses and improving their economic situation than will those unable to demonstrate prospects of a healthier future. ■

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*This article was accepted March 26, 2012.*

### Contributors

C. W. Keck conceived the article, led the writing, and prepared much of the historical material. G. A. Reed conducted interviews with Cuban health professionals and contributed much of the data included in the figures and tables, as well as the material that discussed the



current challenges faced by the Cuban National Health System. Both authors reviewed drafts of the article.

### Acknowledgments

The authors thank Sharon Hull, Amy Lee, and Anthony Costa of the Northeast Ohio Medical University for their thoughtful review of this article and their suggestions for its improvement.

### Human Participant Protection

No protocol approval was necessary because human participants were not involved in this study.

### References

- Scutchfield FD, Mays GP, Lurie N. Applying health services research to public health practice: an emerging priority. *Health Serv Res.* 2009;44(5p2):1775–1787.
- Bunker JP, Frazier HS, Mosteller F. Improving health: measuring effects of medical care. *Milbank Q.* 1994;72(2):225–258.
- McGinnis JM, Foege WH. Actual causes of death in the United States. *JAMA.* 1993;270:2207–2212.
- Shires DA, Stange KC, Divine G, et al. Prioritization of evidence-based preventive health services during periodic health examinations. *Am J Prev Med.* 2012;42(2):164–173.
- Marmot MG, Bell RG. Improving health: social determinants and personal choice. *Am J Prev Med.* 2011;40(1, Suppl. 1):S73–S77.
- Robert Wood Johnson Foundation. *Overcoming Obstacles to Health: Report from the Robert Wood Johnson Foundation to the Commission to Build a Healthier America.* Princeton, NJ: Robert Wood Johnson Foundation; 2008.
- 111th Congress. Patient Protection and Affordable Care Act (HR 3590). March 23, 2010. Available at: <https://www.annualreport.com/text-of-health-care-bill-patient-protection-and-affordable-care-act-hr-3590-text-of-bill>. Accessed May 16, 2012.
- Cooper RS, Kennelly JF, Ordunez-Garcia P. Health in Cuba. *Int J Epidemiol.* 2006;35:817–824.
- Austen BioInnovations Institute of Akron. *Healthier by Design: Creating Accountable Care Communities: A Framework for Engagement and Sustainability (White Paper).* Available at: <http://www.abiakron.org/Data/Sites/1/pdf/accwhitepaper12012v5final.pdf>. Accessed May 17, 2012.
- Danielson R. *Cuban Medicine.* New Brunswick, NJ: Transaction Books; 1979.
- International Bank for Reconstruction and Development. *Report on Cuba: Findings and Recommendations of a Technical Mission ("Informe Truslow").* Baltimore, MD: The Johns Hopkins Press; 1951.
- Agrupacion Catolica Universitaria. Encuesta de los trabajadores rurales 1956-1957. *Econ Desarro.* 1972;12:191–210.
- Castro F. History will absolve me. Editorial de Ciencias Sociales. Havana, Cuba; 1975. Available at: <http://www.marxists.org/history/cuba/archive/castro/1953/10/16.htm>. Accessed February 4, 2012.
- UNESCO. Report on the method and means utilized in Cuba to eliminate illiteracy. 1964. Available at: <http://unesdoc.unesco.org/images/0008/000874/087420eb.pdf>. Accessed February 4, 2012.
- People's Daily. UNESCO awards Cuban agency literacy prize. June 21, 2006. Available at: [http://english.peopledaily.com.cn/200606/21/eng20060621\\_275953.html](http://english.peopledaily.com.cn/200606/21/eng20060621_275953.html). Accessed February 4, 2012.
- Constitución de la República de Cuba. Current Constitution, as amended in 1992 and 2002. Available at: <http://www.cuba.cu/gobierno/cuba.htm>. Accessed February 4, 2012.
- Ley No. 41. Ley de la Salud Pública. Available at: [http://www.parlamentocubano.cu/index.php?option=com\\_content&view=article&id=257:ley-no-41-salud-publica&catid=46:leyes&Itemid=79](http://www.parlamentocubano.cu/index.php?option=com_content&view=article&id=257:ley-no-41-salud-publica&catid=46:leyes&Itemid=79). Accessed February 4, 2012.
- Keck CW. Health for all: a dream realized in Cuba. In: *Medical and Health Annual.* Chicago, IL: Encyclopaedia Britannica Inc.; 1994, 357–362.
- García GD. *El servicio médico rural en Cuba: antecedentes y desarrollo histórico, Cuadernos de la Historia de la Salud Pública #72.* Havana, Cuba: Ministry of Public Health; 1987.
- Roemer MI. *Cuban Health Services and Resources.* Washington, DC: Pan American Health Organization; 1976.
- Feinsilver JM. *Healing the Masses: Cuban Health Politics at Home and Abroad.* Los Angeles, CA: University of California Press; 1993.
- Medical Education Cooperation with Cuba (MED-ICC). The Cuban approach to health care: origins, results, and current challenges. 2006. Available at: <http://www.medicc.org/ns/index.php?s=11&p=0>. Accessed May 16, 2012.
- Morales IR, Fernández JA, Durán F. Cuban medical education: aiming for the six-star doctor. *MEDICC Rev.* 2008;10(4):5–9.
- Ministry of Public Health (Cuba), National Statistics Division. Anuario Estadístico de Salud 2010. Havana, Cuba. 2011. Available at: <http://files.sld.cu/dne/files/2011/04/anuario-2010-e-sin-graficos1.pdf>. Accessed May 16, 2012.
- Ministry of Public Health (Cuba), National Statistics Division. Anuario Estadístico de Salud 2010. Havana, Cuba. 2011 Apr. Table 95, Índice de bajo peso al nacer; Available at: <http://files.sld.cu/dne/files/2011/04/anuario-2010-e-sin-graficos1.pdf>. Accessed March 30, 2012.
- Objetivos de Desarrollo del Milenio-Cuba 2010. Garantizar la sostenibilidad del medio ambiente. Havana, Cuba. 2010. Table 11, Proporción de la población con acceso sostenible a fuentes mejoradas de abastecimiento de agua. Available at: <http://www.undp.org.cu/documentos/1-74%20Informe%20ODM%20espanol.pdf>. Accessed February 4, 2012.
- Ministry of Public Health (Cuba), National Statistics Division. Anuario Estadístico de Salud 2010. Havana, Cuba. April 2011. Table 10, Indicadores demográficos seleccionados. Available at: <http://files.sld.cu/dne/files/2011/04/anuario-2010-e-sin-graficos1.pdf>. Accessed March 30, 2012.
- Ministry of Public Health (Cuba), National Statistics Division. Anuario Estadístico de Salud 2010. Havana, Cuba. April 2011. Table 62, Mortalidad por enfermedades infecciosas y parasitarias. Available at: <http://files.sld.cu/dne/files/2011/04/anuario-2010-e-sin-graficos1.pdf>. Accessed March 30, 2012.
- Ministry of Public Health (Cuba), National Statistics Division. Anuario Estadístico de Salud 2010. Havana, Cuba. April 2011. Table 100, Médicos y estomatólogos según provincia. 1975, 1980, 1985, 1990–2010. Available at: <http://files.sld.cu/dne/files/2011/04/anuario-2010-e-sin-graficos1.pdf>. Accessed March 30, 2012.
- Ministry of Foreign Affairs (Cuba). Cuba vs Bloqueo 2002-2007. Havana, Cuba. Available at: <http://www.cubavsbloqueo.cu/Default.aspx?tabid=801>. Accessed February 4, 2012.
- Kochanek KD, Xu J, Murphy SL, Minino AM, Kung H-C. Deaths: preliminary data for 2009. National Vital Statistics Reports. Available at: [http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59\\_04.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_04.pdf). Accessed March 30, 2012.
- World Health Organization. Global Health Observatory Data Repository: Under Five Mortality. 2010. Available at: <http://apps.who.int/ghodata/?vid=180>. Accessed March 30, 2012.
- Ministry of Public Health (Cuba), National Statistics Division. Table 84, Índice de bajo peso al nacer 1978–2006. *Anuario Estadístico de Salud 2006.* Havana, Cuba: Ministry of Public Health (Cuba); 2006:102.
- Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2010. National Vital Statistics Reports. Available at [http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60\\_02.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_02.pdf). Accessed March 30, 2012.
- National Statistics Bureau (Cuba). *Panorama Ambiental Cuba 2010.* Havana, Cuba. 2011. Available at: <http://www.one.cu/publicaciones/04industria/medioambientecifras/medioamb2010.pdf>. Accessed February 4, 2012.
- Ministry of Public Health (Cuba), National Statistics Division. Table 90, Médicos y Estomatólogos. *Anuario Estadístico de Salud 2005.* Havana, Cuba: Ministry of Public Health (Cuba); 2005:112.
- Strange Maps. Patient to Doctor Ratio-The Patients per Doctor Map of the World. 2007. Available at: <http://bigthink.com/ideas/21237>. Accessed March 31, 2012.
- Santana SM. The Cuban health system: responsiveness to changing population needs and demands. *World Dev.* 1987;15(1):113–125.
- De la Torre E, López C, Márquez M, Gutiérrez JA, Rojas F. *Salud Para Todos: Si es Posible.* Havana, Cuba: Cuban Society of Public Health; 2005.
- Sixto FE. *An Evaluation of Four Decades of Cuban Health Care.* Washington, DC: Association for the Study of the Cuban Economy; 2002:325–343. Available at: <http://www.ascecu.org/publications/proceedings/volume12/pdfs/sixto.pdf>. Accessed May 17, 2012.
- Pan American Health Organization. *El Plan del Médico de la Familia en Cuba.* Washington, DC: Pan American Health Organization; 1992.
- Díaz J, Fernández JA. From municipal polyclinics to family doctor and nurse teams. *MEDICC Rev.* 2000;2(3). Available at [http://www.medicc.org/publications/medicc\\_review/II/primary/poly.html](http://www.medicc.org/publications/medicc_review/II/primary/poly.html). Accessed February 4, 2012.
- Presno C, Sansó F. 20 Years of Family Medicine in Cuba. Available at: [http://www.medicc.org/publications/medicc\\_review/1104/pages/spotlight.html](http://www.medicc.org/publications/medicc_review/1104/pages/spotlight.html). Accessed February 4, 2012.

44. Demers RY, Kemble S, Orris M, Orris P. Family practice in Cuba: evolution into the 1990's. *Fam Pract*. 1993;10(2):164-168.
45. Valdés P, Obrador-Fragoso A. Stratified active screening: where neurotechnology meets public health. *MEDICC Rev*. 2009;11(1):7-10.
46. Whiteford LM, Branch LG. *Primary Health Care in Cuba*. Lanham, MD: Rowman & Littlefield Publishers, Inc; 2008.
47. Perez C. *Caring for Them from Birth to Death*. Lanham, MD: Rowman & Littlefield Publishers, Inc; 2008.
48. Ministry of Public Health (Cuba). *Transformaciones Necesarias en el Sistema de Salud Pública*. Havana, Cuba: Ministry of Public Health; 2010.
49. Ministry of Public Health (Cuba), National Statistics Division. Anuario Estadístico de Salud 1995. Havana, Cuba. 1996. Available at: <http://bvs.sld.cu/cgi-bin/wxis/anuario/?IsisScript=anuario/iah.xis&tag5001=mostrar^m78&tag5009=STANDARD5008=10&tag5007=Y&tag5003=anuario&tag5021=e&tag5022=1995&tag5023=78>. Accessed February 4, 2012.
50. Ministry of Public Health (Cuba), National Statistics Division. Anuario Estadístico de Salud 2000. Havana, Cuba. 2001. Available at: <http://bvs.sld.cu/cgi-bin/wxis/anuario/?IsisScript=anuario/iah.xis&tag5001=mostrar^m644&tag5009=STANDARD&tag5008=10&tag5007=Y&tag5003=anuario&tag5021=e&tag5022=2000&tag5023=644>. Accessed February 4, 2012.
51. Reed G. Cuba's primary health care revolution: 30 years on. *Bull World Health Organ*. 2008;86(5):327-329.
52. United Nations Development Programme. Study on Human Development and Equity in Cuba, 1999 (Investigación sobre Desarrollo Humano y Equidad en Cuba, 1999). UNDP/PNUD. 2000. Available at: [http://hdr.undp.org/en/reports/national/latinamericathecaribbean/cuba/Cuba\\_1999\\_sp.pdf](http://hdr.undp.org/en/reports/national/latinamericathecaribbean/cuba/Cuba_1999_sp.pdf). Accessed February 4, 2012.
53. Lago PM. Eradication of poliomyelitis in Cuba: a historical perspective. *Bull World Health Organ*. 1999;77(8):682-686.
54. Declaration of Alma Ata. International Conference on Primary Health Care, Alma Ata, USSR. September, 1978. Available at: [http://www.who.int/hpr/NPH/docs/declaration\\_almaata.pdf](http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf). Accessed February 4, 2012.
55. Gorry C. MDGs & health equity in Cuba. Available at: [http://www.medicc.org/publications/medicc\\_review/0905/spotlight.html](http://www.medicc.org/publications/medicc_review/0905/spotlight.html). Accessed February 4, 2012.
56. Save the Children. 2010 Mothers' Index Rating. 2010. Available at: <http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/SOWM-2010-INDEX-RANKINGS.PDF>. Accessed February 4, 2012.
57. Gorry C. Training an eye on epidemics: Cuba's national health surveillance system. *MEDICC Rev*. 2005;7(7):6-7.
58. Reed GA. Changes to Cuban health care aim to extend equity. *MEDICC Rev*. 2005;7(9):5-7.
59. Romero T. Changing the paradigm of cancer control in Cuba. *MEDICC Rev*. 2009;11(3):5-7.
60. Gorry C. Cuba's national HIV/AIDS program. *MEDICC Rev*. 2011;13(2):5-8.
61. Pérez J. The human dimension of AIDS in Cuba: Jorge Perez, MD, MS, Director, Pedro Kouri Tropical Medicine Institute. Interviewed by Gail Reed. *MEDICC Rev*. 2011;13(2):14-16.
62. Gorry C. Cuban maternity homes: a model to address at-risk pregnancy. *MEDICC Rev*. 2011;13(3):12-15.
63. Reed G, Frank M. The impact of the U.S. embargo on health and nutrition in Cuba. Washington, DC: American Association for World Health; 1997. Available at: <http://www.medicc.org/resources/documents/embargo>. Accessed February 4, 2012.
64. Coyula M. Havana: aging in an aging city. *MEDICC Rev*. 2010;12(4):27-29.
65. Evenson D. Cuba's biotechnology revolution. *MEDICC Rev*. 2007;9(1):8-10.
66. Kirk JM, Erisman HM. *Cuban Medical Internationalism: Origins, Evolution, and Goals*. New York, NY: Palgrave MacMillan; 2009.
67. Department of Health and Human Services. *Healthy People 2020*. Washington, DC. 2010. Available at: <http://www.healthypeople.gov/2020/default.aspx>. Accessed February 3, 2012.
68. Community Care of North Carolina. 2011. Available at: <http://www.communitycarenc.org/>. Accessed February 2, 2012.
69. Centers for Disease Control and Prevention (CDC). National Prevention Strategy: America's Plan for Better Health and Wellness. Atlanta, Georgia. June 2011. Available at: [http://www.cdc.gov/Features/PreventionStrategy/?s\\_cid=tw\\_cdc627](http://www.cdc.gov/Features/PreventionStrategy/?s_cid=tw_cdc627). Accessed February 4, 2012.
70. Reid TR. *The Healing of America: A Global Quest for Better, Cheaper, and Fairer Health Care*. New York, NY: The Penguin Press; 2009.
71. Baker GK, McKenzie AT, Harrison PB. Local physicians caring for their communities: an innovative model to meeting the needs of the uninsured. *NC Med J*. 2005;66(2):130-133.
72. Carmona RH. Healthy People Curriculum Task Force: a commentary by the Surgeon General. *Am J Prev Med*. 2004;27(5):478-479.
73. Association for Prevention Teaching and Research. Clinical prevention and population health curriculum framework. Washington DC. 2009. Available at: [http://www.aptrweb.org/educationforhealth/Revised\\_CPPH\\_Framework\\_2009.pdf](http://www.aptrweb.org/educationforhealth/Revised_CPPH_Framework_2009.pdf). Accessed February 4, 2012.
74. Maeshiro R, Koo D, Keck CW, eds. Patients and populations: public health in medical education. *Am J Prev Med*. 2011;41(4, suppl. 3):S145-S148.
75. Maeshiro R, Evans CH, Stanley JM, et al. Using the clinical prevention and population health curriculum framework to encourage curricular change. *Am J Prev Med*. 2011;40(2):232-244.
76. Prescott JE. Exploring the context: contemporary medical education. *Am J Prev Med*. 2011;41(4, suppl. 3):S160-S163.