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AUTHORS: EMILY MOSITES, ROB HACKLEMAN, KRISTOFFER L.M. WEUM, JILLIAN PINTYE,
LISA E. MANHART, AND STEPHEN E. HAWES

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TRINIDAD AND TOBAGO ORS CASE STUDY



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Disclaimer

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and Skye Gilbert, Saul Morris, and Shelby Wilson of the Bill & Melinda Gates Foundation and do not necessarily reflect the views of the key informants, thought partners or reviewers.





OVERVIEW

Status:	Unsustained Success
Major players:	David Bratt, MoH, IDRC
Financing:	IDRC, MoH
Price:	Free in public sector
Regulatory change:	None required

FIGURE 1: KEY FEATURES OF TRINIDAD AND TOBAGO ORS SCALE-UP

Trinidad and Tobago scaled-up Oral Rehydration Therapy (ORT) in the early 1980s as economic prosperity was growing in the country. Nevertheless, the country has been classified as an unsustained success in the scale-up of ORS for the treatment of diarrheal disease. In 1987 the Trinidad and Tobago Demographic and Health Survey (DHS) reported that 53% of children with diarrhea were treated with ORS (DHS 1987). However, in a World Bank Study in 2006, ORS was used to treat only 32% of children under 5 years of age with diarrhea in Trinidad and Tobago (World Bank 2010). This figure represents a substantial decline in ORS use compared to the DHS estimate from the late 1980s.

The short scale-up campaign was largely driven by a single physician who observed crowded gastrointestinal wards at the regional hospitals (Figure 1). The small islands had a strong health care infrastructure in place and the targeted population was easily reached with a small budgeted marketing campaign. Since the scale-up, the country has improved its sanitation and water quality, which has led to a substantial reduction in both the incidence of and attention paid to diarrheal disease.

TABLE 1: KEY CONTEXTUAL INFORMATION ABOUT TRINIDAD AND TOBAGO

Statistic	Estimate	Source
Total population	1.3 M	(UNDESA 2011)
Under 5 population	39 K	(MICS 2006)
Under 5 mortality rate	35 / 1,000 live births	(UNDESA 2011)
HDI ranking	62 / 187 countries	(UNDP 2011)
GNI per capita	\$23,439	(UNDP 2011)
Life expectancy	70.1 years	(UNDP 2011)

CONTEXT

The Republic of Trinidad and Tobago has abundant oil and gas reserves and a relatively small population of 1.3 million inhabitants, giving the country one of the highest per capita incomes in the Caribbean. Export of petroleum began in the 1950s, and the twin-island nation saw a doubling of its GDP during the global oil production shortages in the 1970s. The period of high economic growth lasted from 1974 to 1982, and was followed by a long period of negative growth per capita (1983-1993), caused by the fall in the international price of oil and in domestic oil production. The negative growth trend reversed in later years and in current US dollars, per capita GDP increased from \$4,000 in 1990 to over \$15,000 in 2010 (Artana, Auguste et al. 2008, Moya, Mohammed et al. 2010). Access to an improved source of drinking water increased from 40% to 96% of the population between the 1980s and 2006, and 99% of the population had access to sanitary means of waste disposal as of 2006 (UNICEF 2008). Despite this strong



growth in development, Trinidad and Tobago is also vulnerable to natural disasters such as droughts, floods and earthquakes, which potentially result in diarrheal disease outbreaks (UNDP 2012).

DEMOGRAPHICS

In 2010, Trinidad and Tobago had a population of 1.3 million (Table 1), growing at a meager annual rate of less than 1% since the mid-1980s. Approximately equal parts (40%) of the population have either Asian-Indian or African heritage. The remaining 20% includes European, Chinese, Middle-Eastern, and Amerindian ancestry. Only 14% of the population lived in urban areas in 2010, and the three largest cities are Chaguanas (pop. 67,000), San Fernando (pop. 55,000), and the capitol, Port of Spain (pop. 49,000). English is the official language of Trinidad and Tobago, but most people speak a Creole dialect that incorporates African and Spanish heritage (World Bank 2010).

HEALTH CARE SYSTEM

Trinidad and Tobago has both public and private health care providers, all regulated by the Ministry of Health (MoH), which also sets prices. The MoH operates through five Regional Health Authorities (RHAs). The MoH sets guidelines that are implemented by the RHAs with funding provided by the MoH. The RHAs also inspect health facilities to ensure compliance with directives. Public health care is free in Trinidad and Tobago. There are 9 hospitals, 9 District Health Facilities and 96 health centers (Ministry of Health 2012).

The MoH reported diabetes, heart disease, and cancer as the major health challenges faced by the country in its annual report in 2005 (Ministry of Health 2005). According to the 2006 Multiple Indicator Cluster Survey (MICS), between 1996 and 2006 infant mortality increased from 15 to 29 per 1000 and under-5 mortality increased from 15 to 35 per 1000 (UNICEF 2008). This increase appears to be due to an increase in the rate of premature birth and birth defects (PAHO/WHO 2008). UNICEF reports that diarrhea accounted for less than 1% of deaths of children under 5 years of age in Trinidad and Tobago (UNICEF 2008).

OTHER META-TRENDS

Global oil prices experienced a prolonged decline in the 1980s, leading to a decline in the islands' prosperity. Financial turbulence, as well as mistrust between residents of African and Asian-Indian descent (the latter dominating government and professional roles) led to street rioting and claims of widespread corruption in government and public services. Trinidad and Tobago's position as a transit point for cocaine trade also fueled the emergence of drug-related gang violence. Since 2000, the country has experienced considerable economic fluctuation. Development of the financial sector and large increases in natural gas exports resulted in six years of double-digit annual GDP growth, followed by a 27% one-year drop in GDP concurrent with the global financial crisis of 2008-2009 (World Bank 2010).

HEALTH SYSTEM SUCCESSES AND IMPLEMENTATION

Trinidad and Tobago has good public sanitation; a 2006 survey found that 96% of the population uses an improved source of drinking water and 72% have water piped into their dwelling. This represents a substantial increase from 1980, when only 40% of households had water piped in. Ninety-nine percent of residents use sanitary means of waste disposal; 65% and 19% had flush toilets piped to a septic tank and sewer system respectively, while 13% used a pit latrine with a slab cover (UNICEF 2008).



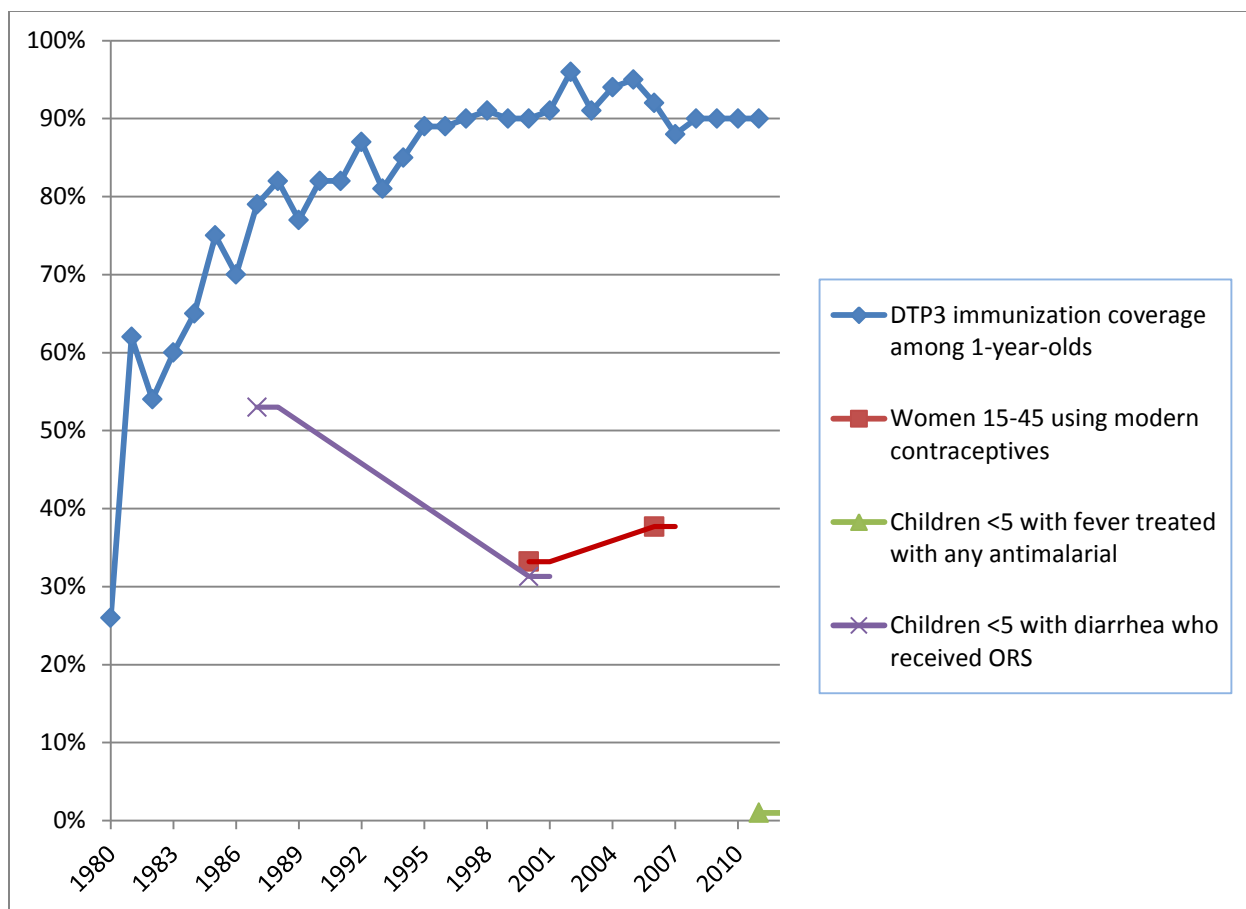


FIGURE 2: KEY HEALTH INDICATORS OF CHILD SURVIVAL IN TRINIDAD AND TOBAGO

Childhood vaccination coverage is high. The MICS 2006 found that by 12 months of age, 96% of children had received at least one dose of DPT vaccine, and 90% had received all 3 doses (Figure 2). Similarly, 91% had received all three polio vaccine doses and 92% had received a measles vaccine. The prevalence of contraceptive use was 44% in 2006 and 78% of pupils complete primary level of education. No evidence of gender inequality in primary education attainment was reported by the survey (WHO 2010).

As mentioned earlier, there are concerns regarding child health due to recent increases in the under-5 mortality rate from 15 to 35 per 1000 between 1996 and 2006 as reported in MICS 2006. Similarly, infant mortality rose from 15 to over 29 per 1000 between 1996 and 2006. A 2008 report by the Pan American Health Organization (PAHO) and the WHO, with participation by the Trinidad and Tobago MoH, attributes the recent increase in under-5 mortality to an increase in premature births and birth defects (PAHO/WHO 2008), rather than diarrheal disease.

Death from dehydration due to diarrhea is rare in Trinidad and Tobago. According to WHO data, diarrheal disease accounted for less than 1% of deaths among children under 5 years of age in 2010 (WHO 2012). In 2003, the MoH reported that 53 children under five died in the entire country; 4 of whom died from intestinal infectious diseases. In the same year at a main hospital, there were 267 hospital admissions for diarrhea of presumed infectious origin. Causes of infant death (presumably 0-12 months in age) based on PAHO/WHO data show diarrhea causing an average of 2-4 deaths per year



from 1990-2004, and accounting for none of the substantial increase in infant mortality during that period (Ministry of Health 2005).

Only approximately 12.8% of children aged less than 6 months are exclusively breastfed in Trinidad and Tobago; a level which is considerably lower than recommended (UNICEF 2008). Breastfeeding is believed to play a protective role in diarrheal diseases, reducing both dehydration and nutritional inadequacy, as well as providing maternal antibodies to potentially hasten recovery. It is not clear why breastfeeding levels are low in Trinidad and Tobago.

STATE OF ORS PRIOR TO SCALE-UP

Historically, the remedy for children with “loose bowels” or “gastro” was a tea from the bud of lime tree or a mixture of wheat flour and arrowroot starch. A caregiver would bring a child to the hospital only if the tea remedy didn’t work, and often the child would die of complications from dehydration. From 1973 to 1979, the average child mortality rate from with gastroenteritis was 6% (Grant 1983).

At that time, Central America and Asia were successfully promoting oral rehydration, something that was rejected by many health care workers in Trinidad and Tobago (Grant 1983). However, a physician named David Bratt sought to change the national perception. Working at the Port of Spain General Hospital, he witnessed severe overcrowding of the gastrointestinal ward and poor working conditions. He believed that the use of oral rehydration would help to decrease the number of patients in the ward; thus addressing overcrowding issues. He gathered support from the MoH, University of the West Indies, the International Development Research Center (IDRC) and the Caribbean Epidemiology Centre (CAREC) and began the Oral Rehydration Programme (Bratt 2012).

APPROACH TO SCALE-UP

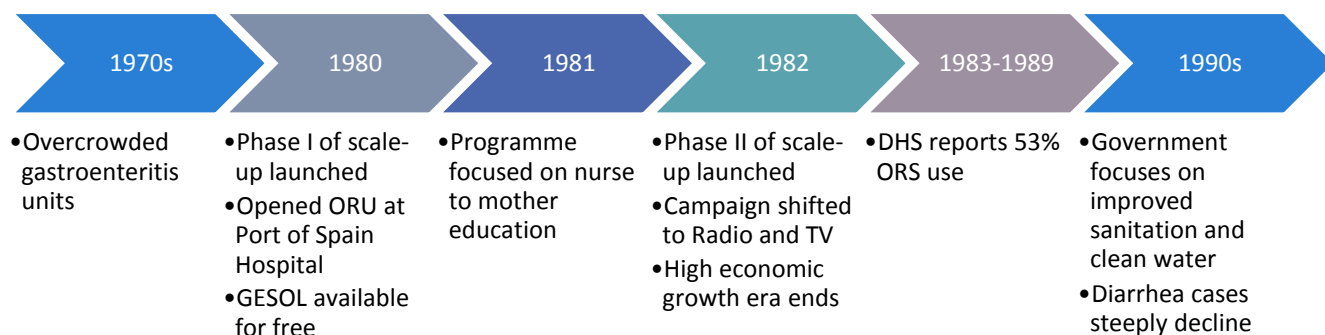


FIGURE 3: TIMELINE OF ORS SCALE-UP

SCALE UP

In January of 1981, the first phase of the Trinidad and Tobago Oral Rehydration Programme launched with funding from the IDRC of Canada, through the University of the West Indies (Cobham and University of the West Indies 1984). Bratt’s goal was to demonstrate that oral rehydration could lessen the suffering from gastroenteritis. The project relied heavily on the strength of the existing health care infrastructure that successfully increased the childhood immunization rate to 95% (Holder 2012).



The first phase of the program actively promoted and distributed GESOL (a UNICEF-produced ORS solution) through specific Oral Rehydration Units (ORUs) in Port of Spain (Figure 3). These ORUs were set up at the Port of Spain General Hospital, George Street, and St. Joseph Health Centers, all located in Port of Spain (Bratt 1984). The goal was to treat dehydrated children with the UNICEF-recommended glucose solution in these units. This phase provided one month of education to nurses; training them to provide face-to-face information directly to mothers. Questionnaires administered to mothers before and after the project showed their knowledge, attitudes, and practices had changed within six months after learning about diarrhea and its treatment (Moses 1983, Bratt 2012). This change was attributed to the nurses educating mothers as well as the mother-to-mother exchange of information (Bratt 2012, Holder 2012). Over 500 children were treated for diarrhea-related dehydration in ORUs, and more than 94% of those children returned to healthy conditions after 24 hours. The Port of Spain General Hospital reported the number of diarrhea-related deaths decreased 50% between 1980 and 1981. The GESOL packets were donated by PAHO, and distributed to the regional health centers by the MoH, making it available to the public, free of charge (Holder 2012). It was estimated that 45,000 satchels were procured annually from PAHO until 1985 (Bratt 2012).

The initial marketing campaign started in 1980 and focused on oral rehydration solutions, but over time the focus shifted more towards homemade oral rehydration therapy. The campaign was successful at communicating that ORS packets were a solution to diarrhea; however a study showed that children brought to the hospital for diarrhea were arriving more dehydrated than before the start of the program (King and Bratt 1988). This finding prompted the program to shift the focus of the campaign from ORS to ORT and promote hydration.

In November of 1982, the second phase of the program was launched, funded by the IDRC and MoH. This phase focused on a mass media campaign which specifically targeted mothers with health education materials on the benefits of oral rehydration therapy and diarrhea control. A study concluded that mothers' recognition of signs of dehydration doubled, however their knowledge regarding the causes of gastroenteritis did not change. The percentage of mothers who reported they would use ORT increased from 55 to 84. There were no data on the proportion of mothers who would use ORS (Bratt, Beckles et al. 1987). The two programs cost less than US\$132,000 and were funded by the IDRC. Researchers recommended that the MoH fund staffing and equipment to produce local promotional material, but it is unclear as to how much, if any, funding the MoH provided (Smith 1985).

In 1992, a small randomized trial was conducted in Trinidad and Tobago to assess whether coconut water could be used as a home-based ORT solution (Adams 1992). Forty non-dehydrated children with loose, non-bloody stools were recruited from the Port of Spain ORU to participate in the trial. Twenty children were treated with ORS and twenty were treated with young coconut water. The ORS or coconut water was sent home with mothers of the children along with instructions, and follow-up was done after 1 day and 7 days. No significant differences were found between ORS and coconut water in terms of duration of diarrhea, number of stools per day, duration of vomiting, weight change or hematological values. The trial concluded that young coconut water is as effective as ORS for mild diarrhea without dehydration (Adams 1992). However, these results may not indicate successful treatment of a dehydrated child, as children with dehydration were not included in the trial. Additionally, the small sample size and short duration of the study limit the ability to detect a difference between the treatment groups. Other studies conducted around the same time resulted in conflicting recommendations: some suggested that coconut water was an appropriate substitute for ORS while



others stated that the electrolyte composition was not suitable (Sunoto 1987, Rolston, Mathew et al. 1990, Yartey, Harisson et al. 1993).

MARKETING CAMPAIGN

The primary objective of the initial marketing campaign was to show parents how to treat gastrointestinal issues at home with oral rehydration solution (Smith 1985). A distinctive logo was created for the Oral Rehydration Programme, which was intended to convey the use of ORS with dehydrated children. This logo was used on all the printed campaign materials as well as the television spots and included the phrase “Treat gastro – use GESOL” (Cobham and University of the West Indies 1984).

As the program shifted the focus from ORS to ORT, the messaging shifted as well. One message in the campaign used the more general phrase “when gastro attacks” to convey this new focus on ORT. The campaign included 12,000 posters and 10,000 bumper stickers that emphasized the benefits of breastfeeding to counteract the heavily-advertised benefits of bottle-feeding. This print art was distributed in popular locations with high impact, including public busses (Cobham and University of the West Indies 1984).

Television media was greatly leveraged because of the high number of TV’s per capita (one TV for every five persons). The state-run television company donated time for public information programs and a small number of advertisements. Similarly, radio station managers gave airtime to the Oral Rehydration Programme’s cause. Three stations broadcast news and information, one of which hosted a call-in program with health care providers focused on diarrhea prevention. As with television, radio stations offered a very small amount of free advertising (Cobham and University of the West Indies 1984).

The campaign was intended to be both relevant to and empowering for mothers. The messaging targeted mothers of all economic strata and highlighted the use of whatever resources the mother had available. Receptive mothers disseminated this message to others (Holder 2012). The messaging and social influence were keys to the campaign’s success. The campaign was financed by the IDRC and the cost was US\$7,200 (TT\$45,500) (Cobham and University of the West Indies 1984).

IMPACT

According to the 1987 DHS study, out of 1,853 children, 113 reported having diarrhea in the last two weeks. Fifty-three percent of these children were treated with ORS packets, while 13% were treated with a home-made solution (DHS 1987).

The use of ORS has declined in recent years; the MICS 2000 found that approximately eight in ten children with diarrhea received one or more of the recommended home treatments (pre-packaged solution or homemade solution). In 2006, according to the World Bank, ORS was used to treat only 32.1% of children under 5 with diarrhea in Trinidad and Tobago (World Bank 2010). The MICS 2006 found that only 3.7% of respondents reported having a child who had diarrhea in the prior two weeks. Given the low response, estimates of ORS use were not reported. Bratt believes the marketing campaign increased the ORT rates, which reduced ORS rates (Bratt 2012).

Education of the private sector has been lacking in the ORS campaigns to date. A study published in 2004 assessed the treatment practices of pharmacists in Trinidad and Tobago. Survey questions were



distributed to 92 of the 220 registered pharmacies in country. The survey found that 70% of pharmacists would recommend ORS as the first choice therapy for children, but only 32% recommended it as the first choice for adults. Pharmacists recommended antimicrobials, anti-motility agents and absorbents in adults even though these drugs have no beneficial value and are not endorsed by the WHO. While the MoH policy advises against such drugs, the study suggests that the pharmacists are influenced both by patients' demands for as well as the profitability of such drugs. Some pharmacists admitted they refrained from advising in-home remedies because of the possible negative sales impact (Karim, Ramdahin et al. 2004).

Though the Pharmacy Board of Trinidad and Tobago proactively distributed the WHO ORS guidelines to pharmacies in the country, they have yet to be widely implemented (Karim, Ramdahin et al. 2004). There is still a need to continue educating pharmacists in the safe and effective treatment of diarrhea.

CONCLUSION

Despite the economic decline in the late 1980s, Trinidad and Tobago has ridden the second oil boom to become one of the wealthiest nations in the Caribbean. In recent years, the country was taken off the Organization for Economic Cooperation and Development list of developing countries (Gopie 2011). Attention to ORT has diminished as sanitation has improved and diarrheal illness has decreased dramatically.

Trinidad and Tobago is a nation that scaled up a campaign for ORT at a time when the national attention to diarrheal disease was high due to hospital overcrowding, poverty and lack of sanitation. The success of the 1980s campaign was the result of well-targeted publicity to reach women of child-bearing age, and face-to-face training of nurses. However, the campaign was short, underfunded, and much of it relied on a single physician. Since the campaign, prosperity and development have led to widespread access to sanitation, clean water, and modern health care. Childhood mortality due to diarrhea is now rare in Trinidad and Tobago, and emphasis on the use of ORS has waned considerably.



APPENDIX 1:

EVALUATION OF ORS SCALE-UP EFFORTS ACROSS SIX KEY COMPONENTS

Component	Degree of success (H/M/L)	Drivers of success/failure
Development of improved product (including pricing)	L	<ul style="list-style-type: none"> Existing product, GESOL, produced in out of country Free
Marketing campaign	M	<ul style="list-style-type: none"> Large reach Relevant to all economic strata Focused on behavioral change and empowering women, not product
Regulatory change	H	<ul style="list-style-type: none"> Project support from the MoH Low regulation allowed for efficient acquisition of GESOL
Improving private provider knowledge	L	<ul style="list-style-type: none"> Current studies indicate there is still a need to improve pharmacist education
Improving public provider knowledge	H	<ul style="list-style-type: none"> Small but effective training of nurses led to large change in mothers knowledge, attitude and practices
Increasing availability of supply in the public and private sector	M	<ul style="list-style-type: none"> GESOL accessible everywhere publicly Geographically small area and small number of governmental agencies led to easy distribution Not much known about the private sector supply
Financing of scale-up	H	<ul style="list-style-type: none"> The country's small geographic size results in large reach with a small budget



REFERENCES

- Adams, W., and Bratt, David (1992). "Young coconut water for home rehydration in children with mild gastroenteritis." *Tropical and Geographical Medicine* **44**: 4.
- Artana, D., S. Auguste, R. Moya, S. Sookram and P. Watson (2008). Trinidad & Tobago: Economic Growth in a Dual Economy Inter-American Development Bank (IDB).
- Bratt, D. E. (1984). "Effect of oral rehydration therapy on hospital admission and mortality from gastroenteritis."
- Bratt, D. E. (2012). Telephone Interview, personal communication. University of Washington START program.
- Bratt, D. E., G. L. A. Beckles, Y. Holder, J. Winter Roach, T. Johnson and D. Ramdeen (1987). "A radio and television campaign to educate Trinidadians and Tobagonians about diarrhoea, dehydration and oral rehydration-abstract." *West Indian Medical journal* **36**: 12.
- Cobham, J. and University of the West Indies (1984). "Trinidad and Tobago oral rehydration programme."
- DHS (1987). Demographic and Health Survey - Trinidad and Tobago. Family Planning Association of Trinidad and Tobago.
- Gopie, R. (2011). Are We developed? *Trinidad Express Newspaper*.
- Grant, L. (1983). The Simple Solution. *Cajanus*. **16**: 19 - 24.
- Holder, D. Y. (2012). Consultant Epidemiologist/Biostatistician. Phone Interview on August 14th.
- Karim, R., P. Ramdahin, J. R. Boodoo, A. Kochhar and L. M. Pinto Pereira (2004). "Community pharmacists' knowledge and dispensing recommendations for treatment of acute diarrhoea in Trinidad, West Indies." *International Journal of Clinical Practice* **58**(3): 264-267.
- King, J. and D. Bratt (1988). "Socio-economic, Dietary, and Cultural Factors Associated with Diarrhoeal Disease in Trinidad and Tobago." *Journal of Tropical Pediatrics* **34**(3): 104-107.
- Ministry of Health, R. o. T. a. T. (2005). Annual Statistical Report 2004-2005.
- Ministry of Health, R. o. T. a. T. (2012). "Webpage, Ministry of Health, Republic of Trinidad and Tobago." from <http://www.health.gov.tt/>.
- Moses, S. (1983). Oral Rehydration (Trinidad) - Phase I International Development Research Centre (IDRC).
- Moya, R., A.-M. Mohammed and S. Sookram (2010). Productive Development Policies in Trinidad and Tobago: A Critical Review *IDB Working Paper Series*, Inter-American Development Bank (IDB).
- PAHO/WHO (2008). Health Systems Profile: Trinidad and Tobago. Washington, D.C.
- Rolston, D. D., P. Mathew and V. I. Mathan (1990). "Food-based solutions are a viable alternative to glucose-electrolyte solutions for oral hydration in acute diarrhoea--studies in a rat model of secretory diarrhoea." *Trans R Soc Trop Med Hyg* **84**(1): 156-159.
- Smith, K. (1985). Oral Rehydration (Trinidad) - Phase II International Development Research Centre (IDRC).
- Sunoto (1987). "Home prepared oral rehydration solution." *Paediatr Indones* **27**(11-12): 237-250.
- UNDESA (2011) *World Population Prospects: The 2010 Revision*.
- UNDP (2011). Human Development Report 2011: Madagascar.
- UNDP (2012). Country Programme Document for Trinidad and Tobago 2012-2015, UNDP.
- UNICEF (2008). Multiple Indicator Cluster Survey 3 - Trinidad and Tobago, The Government of the Republic of Trinidad and Tobago.
- WHO (2010). "Trinidad and Tobago Immunization Profile Application."



WHO (2012). Country Profile: Trinidad and Tobago.

World Bank, T. (2010). Country Profile - Trinidad and Tobago.

Yartey, J., E. K. Harisson, L. A. Brakohiapa and F. K. Nkrumah (1993). "Carbohydrate and electrolyte content of some home-available fluids used for oral rehydration in Ghana." J Trop Pediatr **39**(4): 234-237.

