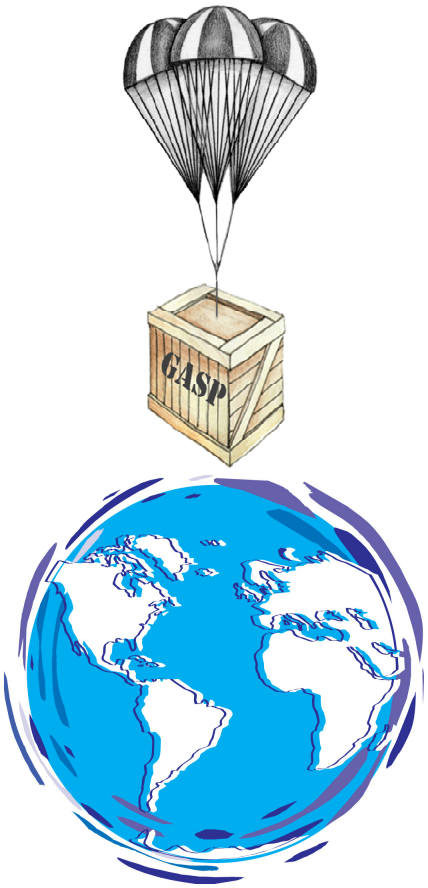
Global Access to Spirometry Project



Global Access to Spirometry Project (GASP)

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What is the problem we're addressing?

Asthma is a very common condition, affecting between 10-20% of the population, ranging from infants to the elderly. Exacerbations result in frequent visits to Emergency Departments, hospitalizations and deaths, all of which are potentially avoidable. There are huge impacts on patients, families, health care system costs and society with substantial loss of productivity.

Although there is no cure for asthma, appropriate evidence-based management that includes a partnership between the health care team and the patient most often results in achievement of excellent control, a normal lifestyle and good long term outcomes.

Unfortunately low income countries and impoverished residents of high-income often suffer from sub-optimal asthma management and outcomes. In most cases, this is largely a result of the lack of a structured chronic disease management strategy for asthma. Relatively simple, inexpensive measures can result in very high impacts at the patient, population and health system levels. In order to improve population health as it relates to asthma, it is essential to assure an accurate diagnosis, provide education, self-management training and longitudinal reinforcement to patients, and to assure access to appropriate medications for maintenance therapy.

This document outlines a practical, concrete strategy for the development of a program to perform diagnostic spirometry and provide asthma education in developing nations as well as in underserviced areas in developed nations. It is based on experience gathered from the development of such a program in Guyana, South America by a specialist respiratory team from Vancouver, BC, Canada in conjunction with the Georgetown Public Hospital Corporation and the Guyana Ministry of Health services (Appendices 1, 2).

Objectives

A. Primary
   1. Establishment of spirometry capacity for the accurate diagnosis of asthma and other respiratory conditions
   2. Development of an education and self-management program for patients with asthma and their families

B. Secondary
   1. Facilitate health system improvement with incorporation of principles of chronic disease management (CDM)
   2. Expand to include diagnosis and management of Chronic Obstructive Pulmonary Disease (COPD)
   3. Partner with other CDM activities such as heart failure, chronic kidney disease, diabetes, etc. around patient education & self-management, primary and secondary prevention (healthy living, smoking cessation, diet, exercise, etc.)

GASP: Key Concepts

- Important to begin with a needs assessment
- Requirement for adequate local infrastructure
- One size does not fit all- key to understand locally relevant information
- Essential to identify relevant stakeholders (medical, public health, institutional administration, ministry of health)
- Identification of local key opinion leader "champions"
- Establish realistic expectations for all partners
- Focus on sustainability
  - High quality training and education for local personnel, limit reliance on external individuals
- Encourage scalability and transferability to other sites
  - Employ "hub (centre of excellence, training site) and spoke (satellite)" model to minimize resource requirements
- Embrace evidence-based, guideline driven care (http://www.ginasthma.org/ ; http://carpha.org/Portals/0/docs/Clinical%20Guidelines/Managing%20Asthma%20in%20the%20Caribbean.pdf)
- Incorporate interdisciplinary health care providers
- Partner with champions from other chronic disease programs
- Identify optimal location
  - Acute care hospital likely best (proximity to Emergency Department, interdisciplinary allied health)
  - Public health clinic

Spirometry

- Spirometry is a simple, well-standardized test which is essential for the accurate diagnosis of asthma and estimation of its severity, level of control and response to treatment.
- Spirometry is inexpensive, non-invasive and can be completed in most naïve subjects greater than 6 years old in 30-60 minutes.
- Spirometry can be effectively and safely instituted in most settings and does not require a sophisticated health care environment. It is well-suited for use in low income countries and under-resourced regions in high income countries.
- Health professionals with basic knowledge and technical skills can be trained on-site to perform spirometry in approximately 1-2 weeks.
- Attention to quality control is essential.

Physical resources/Basic furnishings

- Spirometry Room (minimum 11 meters^2)
  - Essential
    - Table for spirometer & laptop computer
    - Sink
    - Electrical outlets
    - 3 chairs
    - Weight scale, height measuring tape
    - Trash can
    - Locking door
    - Lockable 4 drawer filing cabinet
  - Desirable
    - Air conditioner
    - Internet access
    - Telephone
    - Shelving for supplies
    - Well-ventilated (either through open windows or ventilation system)

- Asthma Education Room adjacent to Spirometry Room (14 meters^2)
  - Essential
    - Desk
    - Sink
    - 4 chairs
  - Desirable
    - Internet access
    - Telephone
    - Air conditioner

Spirometry Equipment*

		Cost (CAN $)
Capital costs	Spirometer @ $2,000 x 2	$4,000.00
	Laptop computer @ $600 x 2	$1,200.00
	Spirometer calibration syringe	$350.00
	Color printer	$300.00
	Data backup	$100.00
	Voltage regulator	$200.00
	Extension cord/power bar	$30.00
Disposables (per 100 encounters)	Spirometer mouthpieces	$200.00
	Valved holding chambers (spacers)	$700.00
	Noseclips	$50.00
	Printer paper	-
	Printer cartridges	-
Cleaning supplies	Cidex, ammonia, alcohol, gauze pads, hand cleaner, etc.	-

**all costs are approximate*

Human Resources

- Two spirometry techician/asthma educators (essential)
  - Ideally one physician + one nurse or other allied health professional
  - Minimum two individuals trained at initiation to provide backup and assure consistent presence
- Administrative clerk (desirable)
  - Book appointments
  - Process results
  - Data tracking
  - Miscellaneous

Local Personnel Training

- Initial on site
  - Basic asthma clinical and physiology education for staff
  - Principles of chronic disease management
  - Principles of quality assurance
  - Performance of spirometry
  - Data management and backup
  - Asthma education, inhaler use, developing action plans, peak flow monitoring
- Remote communication for ongoing trouble shooting
  - Regular e-mail communication
  - Remote videoconferencing (Skype® or other) where feasible

- Establish sustainability
  - Where feasible, arrange for local staff to eventually receive
    - intensive training in centre of excellence (e.g. training team site; Vancouver or other)
    - further advanced training through a certified training program (e.g. RespTrec® http://www.resptrec.org/course/)

Support Services

- Liase with Biomedical Engineering to determine capacity for equipment maintenance and troubleshooting
- Liase with Cleaning & Sterilization Dept to determine capacity for processing disposables
- Identification of local suppliers for disposables (where possible)

Pharmaceutical Survey

- Asthma control involves a series of lifestyle adjustments (e.g. trigger avoidance, smoke avoidance, improvement in air quality in home and working environment) but also requires "reliever" and "controller" medications.
- During the initial phases of the project, the team should survey local medication availability (i.e. through public and private pharmacies), local prescribing practices, and potential availability of asthma medications in the region. A reliable stream of high-quality and appropriate medications will be required to ensure sustainable success of any asthma treatment program.

Project Initiation

- Initial site visit ~1 week to ensure feasibility, meet with local health officials and key stake holders to inform them of the project and to ensure ongoing hospital, health care provider and Ministry of Health support
- Training team
  - One Respiratory Medicine/Asthma Physician with experience in global/rural health
  - 2 Respiratory Therapists or Respiratory Nurses experienced in global/rural health
- Initial training timeframe
  - Assuming physical and human resources are in place, initial setup of the spirometry lab, basic training for personnel in spirometry performance, asthma education, quality assurance will take in the range of 5-10 working days

Ongoing Program Support and Oversight

- Follow-up visits by training team every 4-6 months x ~2 years, then as needed
- Respiratory Medicine specialist/Respiratory Therapist remote review of spirometry test performance and results interpretation

Standard Operating Procedures to be developed

- Infection control
- Indications and contra-indications to spirometry
- Patient and staff safety
- Spirometer calibration
- Spirometry testing procedure
- Data backup
- Referral and appointment processes
- Spirometry report generation and delivery to referral source
- Quality control
- Education materials
- Action plan development
- Communication between local and training teams for ongoing support, troubleshooting, problem-solving

Program Evaluation

- Establishing metrics to be tracked a prospectively is paramount. This is essential to document the impact of implementing GASP to health facility administrators, health agencies, government ministry of health, project funders
- Recommend to establish an evaluation framework based on principles of the Institute for Health Improvement "Triple Aim Framework" (Appendix 4)
    1. Improving the patient experience of care (including quality and satisfaction)
    2. Improving the health of populations
    3. Reducing the per capita cost of health care

Patient Referral Sources

- Initial emphasis should be directed towards the Emergency Department (intervention likely to have greatest impact)
- Adult and pediatric inpatient hospital wards
- Public health centres
- Community clinics

Potential Funding Sources

- Ministry of Health
- Global health programs (e.g. international university programs, etc.)
- Private foundations
- Non-governmental organizations
- Other

General Recommendations

- Keep it simple- make it easy for the adopter
- Be responsive to local needs
- Gain feedback from the providers and users
- Plan, Do, Study, Act (PDSA)- continuously review progress to see what does and what doesn't work (Appendix 3)
- Emphasis on quality- if it's not done right, it's not worth doing
- Attention to culturally sensitive health literacy
- Assure access to appropriate medications

Acknowledgements

- Supported by an International Solidarity Project Grant from the Chiesi Foundation
- Administrative support provided by British Columbia Lung Association and the GPHC Echo Lab

Appendix 1- Project photos

Asthmatic patients receive treatment at Georgetown (Guyana) Public Hospital Emergency Department, March 2013.

Launch of the Georgetown Public Hospital (GPHC) Asthma Education and Spirometry Lab, November 2013.

Performing spirometry at the GPHC Lab, November 2014.

Training GPHC staff to provide Asthma Education and Self-Management Teaching, November 2014.

Guyana Asthma Education & Spirometry (GASP) Team…

Back row: Dr. J. Johnston*; Nurse E. Piggott; C. Rempel, RRT, CRE*; Dr. R. Levy*; Dr. D. Persaud

Front row: Nurse Y. Maxwell, Dr. K. Jaipersaud, Catherine Sanders, RRT, CRE*

**Vancouver*

Appendix 2- 7th Guyana Medical Scientific Conference, Nov. 24, 2014

Optimizing Asthma Management at Georgetown Public Hospital Corporation (GPHC): Development of an Interdisciplinary Spirometry & Asthma Education Program

Kumarie Jaipersaud[1], Esofa Piggott[1], Carmen Rempel[2], Catherine Sanders[2], Radha Luknauth[1], Dev Persaud[1], Debra Isaac[3], Norah Flaherty[2], Robert D. Levy[2]
[1]GPHC; [2]The Lung Centre/Pacific Lung Health Centre, University of British Columbia; [3]Libin Cardiovascular Institute of Alberta, University of Calgary[3]

Objective:
Asthma affects approximately 10-15% of children and adults in Guyana and imposes a huge burden on health outcomes as well as direct and indirect health care costs. Asthma guidelines emphasize the importance of accurate asthma diagnosis with spirometry, patient/caregiver education and access to appropriate medications. In cooperation with GPHC and the Guyanese Ministry of Health, a structured Spirometry & Asthma Education Program was established at GPHC in November 2013 with three major objectives: (1) optimize asthma health outcomes, (2) improve the patient/provider health care experience and (3) minimize net per capita cost.

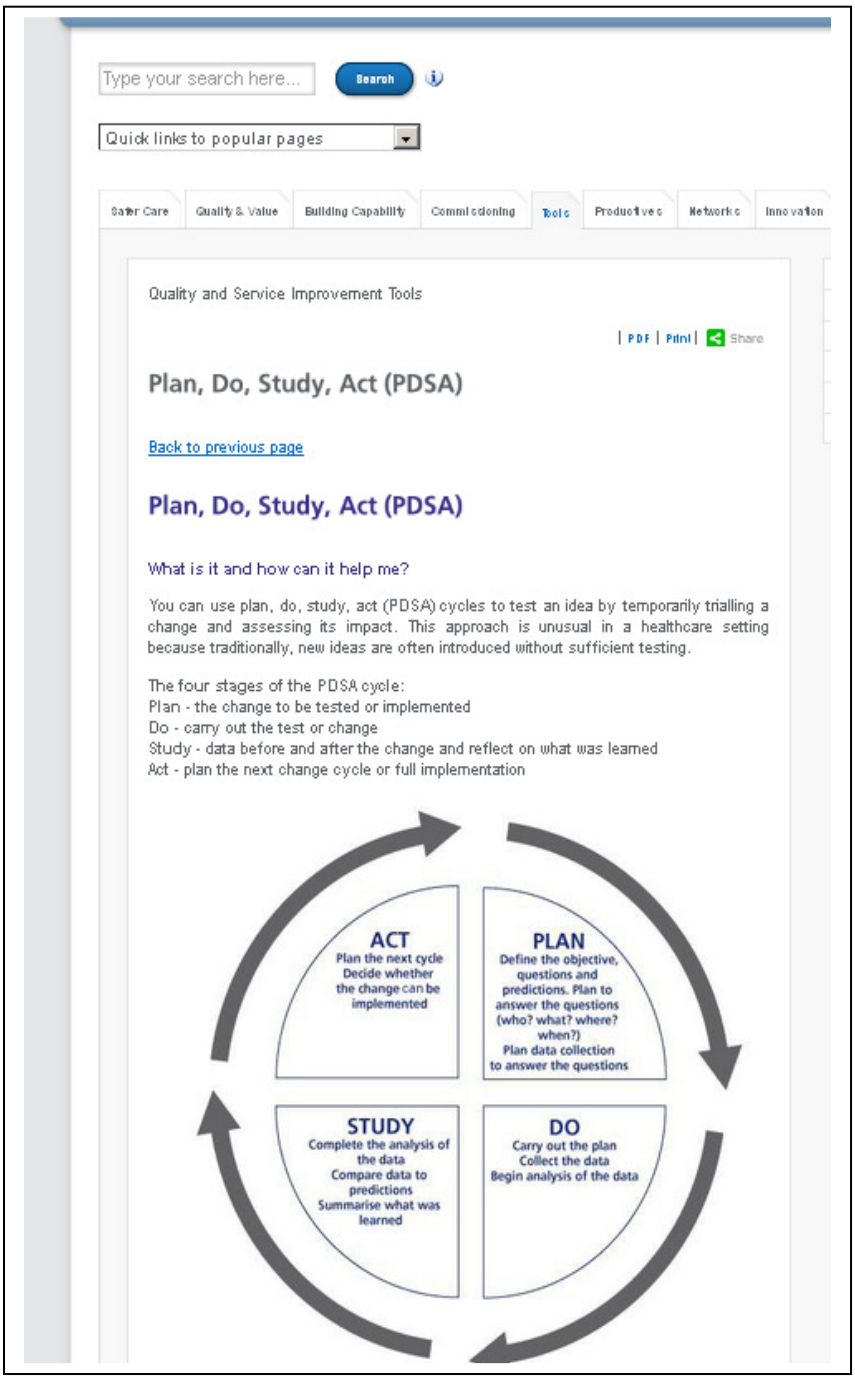
Design & Methods:
The Program was designed to be self-sustaining, scalable and transferable to other health care situations and regions. Basic principles of quality control were instituted from the outset, and quality improvement was conducted using Plan, Do, Study, Act (PDSA) cycle methodology. Needs analysis was conducted through meetings and continuing health education activities with GPHC units and clinics, the Emergency Department (ED), Community Health Centers, health professionals and administrators. On-site training was provided to selected, dedicated physicians and nurses, and expert supervision of spirometry interpretation was provided remotely. The GPHC formulary was revamped to assure availability of essential asthma controller medications. Referred patients underwent spirometry to evaluate lung function as well as structured asthma self-management education where indicated.

Results:
Between Nov 2013-Sept 2014, 170 patients were referred to the GPHC Spirometry & Asthma Education Program. Patients were 58% female and aged 38 ± 17 (mean ± SD) years (range 5-75). New patients accounted for 94% of visits. 74% of patients were non-smokers, 26% were former or current smokers. Spirometry results showed 38% obstructive ventilatory abnormalities (suggesting asthma or COPD), 18% restrictive/combined abnormalities, 25% were normal and 15% were uninterpretable. 47% of patients were referred from the GPHC ED, 5% from hospital wards, 17% from GPHC Clinics, 7% from community physicians and 5% from Community Health Centers. 10% of the first 50 patients were referred from the ED *vs.* 63% of the most recent 50 referrals. Following evaluation in the Program, 24% of the first 50 patients were referred to Community Health Centers for follow-up *vs.* 62% of the most recent 50 patients.

Conclusions:
Early results indicate a pattern of increasing referrals to the Spirometry & Asthma Education Program from the ED and increasing disposition for follow-up from the Program to Community Health Centers. This flow supports a system transition strategy from acute episodic ED management of asthma to chronic disease management in the community. Ongoing Program endeavors include exploration of sustainable spread through knowledge transfer to Georgetown Community Health Centers and hospitals outside Georgetown, as well as enhancement of education/self-management activities targeting healthy living (smoking cessation, exercise, diet) in conjunction with COPD and heart failure chronic disease management programs at GPHC.

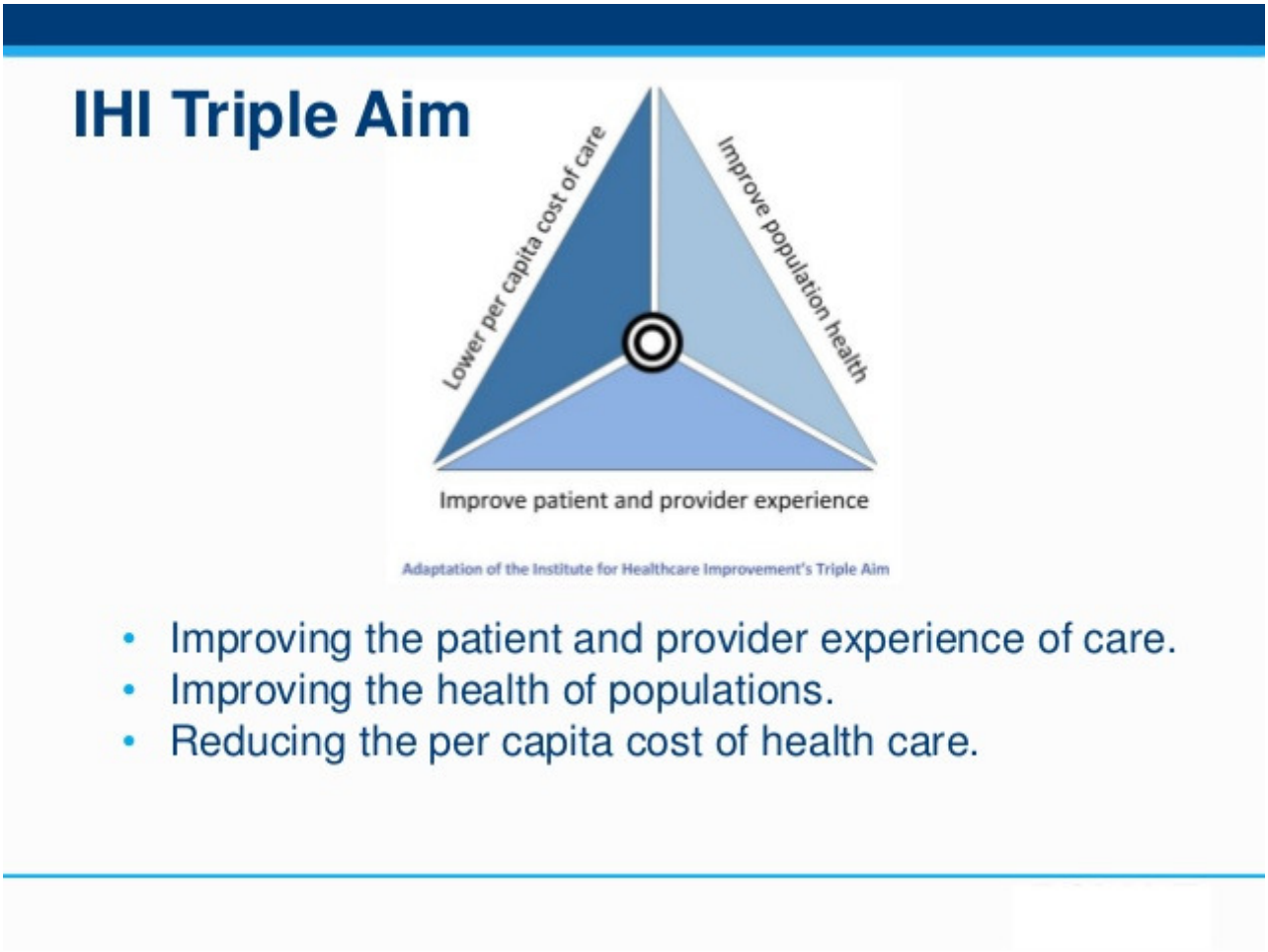
Supported by an International Solidarity Project Grant from the Chiesi Foundation; Administrative support provided by British Columbia Lung Association and the GPHC Echo Lab.

Appendix 3- How too improve: PDSA



http://www.institute.nhs.uk/quality_and_service_improvement_tools/quality_and_service_improvement_tools/plan_do_study_act.html

Appendix 4- The IHI Triple Aim Framework



Stiefel M, Nolan K. *A Guide to Measuring the Triple Aim: Population Health, Experience of Care, and Per Capita Cost*. IHI Innovation Series white paper. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2012.

http://www.ihi.org/resources/Pages/IHIWhitePapers/AGuidetoMeasuringTripleAim.aspx