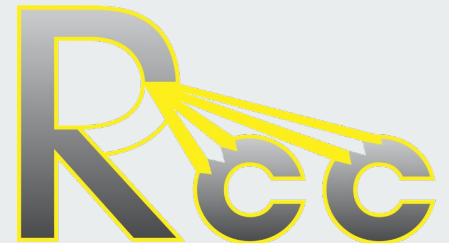




Supporting radiological security through radiotherapy education

A Guatemala case study & overview of Rayos Contra Cancer

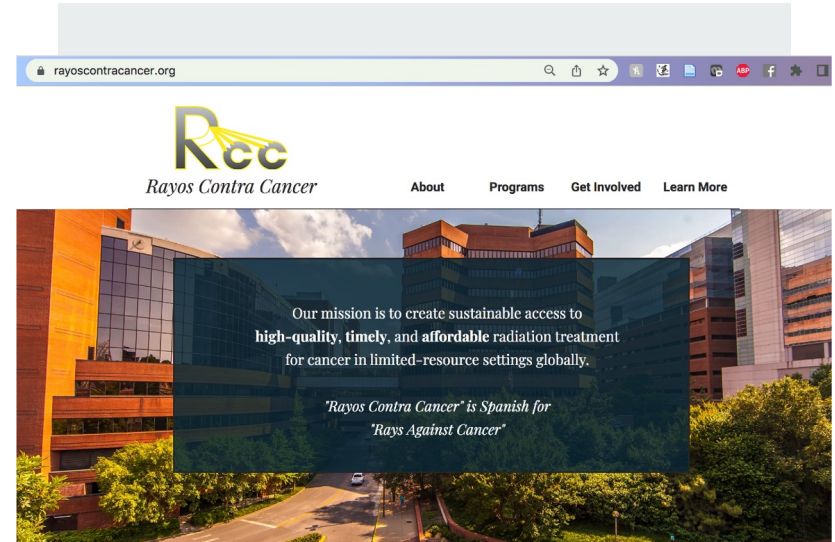
*Emily Kruse, MPH
Program Manager
Rayos Contra Cancer*



About Rayos Contra Cancer

RCC is a 501c3 non-profit organization with the mission to create sustainable access to high-quality, timely, and affordable radiation treatment for cancer patients in limited-resource settings globally.

Our programs focus on education and training in areas where support is otherwise scarce for radiation therapy.



Scalable Solutions for Global Health Radiotherapy through
Education & Training, Research, and Collaboration

Structure of RCC training programs

- Programs are longitudinal: average 17 sessions
- One session per week, each session 1 hour long, conducted on Zoom
- Sessions are mostly didactic lecture slides, some case-based demonstrations
- Sessions are scheduled to avoid clinic conflicts and to be time-zone friendly
- Participants are working radiotherapy clinicians in LMICs
- No cost

The screenshot shows a Zoom meeting interface. The main content is a slide titled "Caso 1 Pregunta" with a list of treatment options:

- Tratamiento
- 1. Cx directo (coloproctólogo dijo resección abdomino-perineal)
- 2. RtQt larga y Cx, luego evaluar Qt adyuvante (Sauer)
- 3. Rt corta y Cx, con o sin delay (Bujko, Ngan, Erlansen)
- 4. TNT con Rt corta y luego folfox x 9 (Rapido)
- 5. TNT con RtQt larga y luego folfox x 8 de consolidación (Opra)
- 6. TNT con Qt (3 drogas) y luego RtQt (Prodige 23)

On the right side, there is a poll titled "Caso 1 - tratamiento" with the following results:

Question	Answers	Percentage
1. ¿Tratamiento? (Single Choice)	214/214 (100%) answered	
1) Cx directo (coloproctólogo dijo resección abdomino-perineal)	(3/214) 1%	
2) RtQt larga y Cx, luego evaluar Qt adyuvante (Sauer)	(14/214) 7%	
3) Rt corta y Cx, con o sin delay (Bujko, Ngan, Erlansen)	(35/214) 16%	
4) TNT con Rt corta y luego folfox x 9 (Rapido)	(142/214) 66%	
5) TNT con RtQt larga y luego folfox x 8 de consolidación (Opra)	(12/214) 6%	

The interface also shows a list of participants on the right, including David Martínez, Benjamin Li, RCC Zoom, Dr. Sebastian Sole, ALEJANDRO B..., ALEJANDRO BLANCO, and romaralonsfuentesbaas. The bottom of the screen shows the Zoom control bar with options like Mute, Stop Video, Security, Participants, Chat, Share Screen, Polls/Quizzes, Reactions, Interpretation, Apps, More, and Leave.

RCC program workflow



Identify educational needs through partnership with local leaders & clinics.



Coordinate team of expert volunteer educators and create course curriculum.



Recruit participants through word-of-mouth, email campaigns, WhatsApp messaging.



Enroll participants, run course, and evaluate outcomes. Document training & provide access to materials.

Guatemala Case Study - Overview

Mid-2017 to late 2019

Collaboration between community non-profit, US university, US government, manufacturer, medical centers

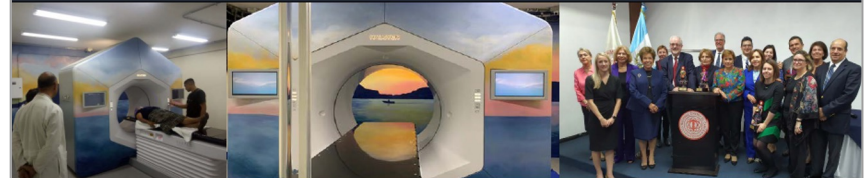
Lack of RT imaging, rotational RT, CBCT¹

Before installation of Halcyon:

- Only ~50% of eligible Guatemalan cancer patients received radiotherapy²
- About half of patients presenting to INCAN were in advanced stages of cancer¹
- Treatment wait time was 3-9 months²



Providing State of the Art Radiotherapy Equipment in the Referral Cancer Hospital LIGA/INCAN in Guatemala FINAL RESULTS REPORT



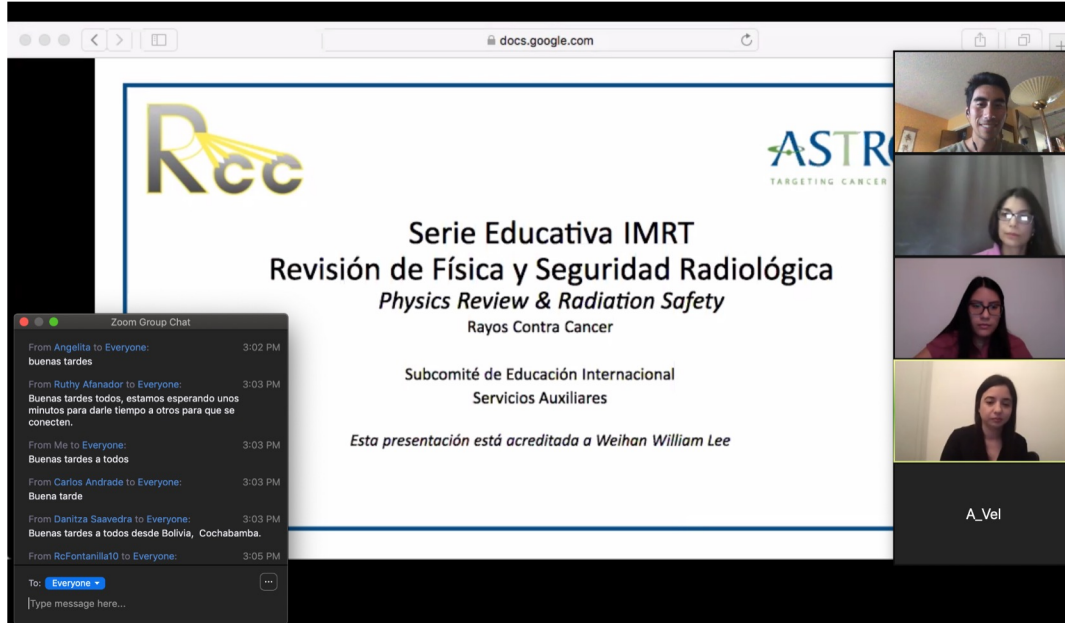
Activity Start Date and End Date: 10/01/2018 to 09/30/2020
AOR Name: Raymond Jennings

Submitted on: December 22, 2020
Submitted by: Jacaranda van Rheenen, PhD
Washington University in St. Louis
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Email: jvanrheenen@wustl.edu

 Washington
University in St. Louis



Guatemala Case Study - RCC Training



The screenshot shows a Zoom meeting interface. The main window displays a presentation slide with the following content:

- Logo: **Rcc** (with three yellow lines radiating from the 'c')
- Logo: **ASTRO** (with the tagline "TARGETING CANCER")
- Title: **Serie Educativa IMRT**
- Subtitle: **Revisión de Física y Seguridad Radiológica**
- English subtitle: *Physics Review & Radiation Safety*
- Topic: **Rayos Contra Cancer**
- Organizer: **Subcomité de Educación Internacional**
- Service: **Servicios Auxiliares**
- Accreditation: *Esta presentación está acreditada a Weihan William Lee*

The Zoom chat window in the bottom-left corner shows the following messages:

- From Angellita to Everyone: 3:02 PM
buenas tardes
- From Ruthy Afanador to Everyone: 3:03 PM
Buenas tardes todos, estamos esperando unos minutos para darle tiempo a otros para que se conecten.
- From Me to Everyone: 3:03 PM
Buenas tardes a todos
- From Carlos Andrade to Everyone: 3:03 PM
Buena tarde
- From Danitza Saavedra to Everyone: 3:03 PM
Buenas tardes a todos desde Bolivia, Cochabamba.
- From RFontanilla10 to Everyone: 3:05 PM
- To: Everyone
- Type message here...

On the right side of the Zoom window, there is a vertical stack of four video thumbnails showing participants. The bottom-most thumbnail is labeled "A_Vel".

April 2020 - August 2020

115 participants across 8 clinics

Curriculum included:

- IMRT treatment delivery equipment and modality
- IMRT physics review & radiation safety
- Treatment setup
- Case-based learning

We have created 7 courses and run 25 programs

HDR Brachytherapy for MPs	Guides centers on preparing for a new HDR suite (accepting source, commissioning), treatment planning for different applicators, and applying radiobiologic and clinical principles.	<ul style="list-style-type: none"> ● 2019-Africa & Mid. East ● 2021-Latin America ● 2022-Africa
IMRT for MPs	Help centers transition from 3D to IMRT. Teaches best practices and common errors in performing QA, commissioning TPS, contouring for MPs, and inverse planning. Some versions also had RO audiences and contouring content.	<ul style="list-style-type: none"> ● 2019-Latin America ● 2020-Africa ● 2020-Latin America ● 2022-Africa & Mid. East ● 2022-Latin Am.
IMRT for RTTs	Specifically designed for RTTs. Empowers them with knowledge, tools, and practical examples so they can deliver safe, quality care during simulation, setup, and treatment.	<ul style="list-style-type: none"> ● 2020-Latin America ● 2021-Latin America ● 2021-Africa in English ● 2021-Africa in French ● 2023-Africa (+others) ● 2023-Latin America
SBRT/SRS for MPs and ROs	Helps centers safely transition to SBRT/SRS. Guides centers on intracranial and extracranial simulation, dosimetry and treatment planning, IGRT and treatment delivery, and QA. Includes case-based learning with feedback.	<ul style="list-style-type: none"> ● 2019-Peru ● 2020-Latin America ● 2021-Middle East ● 2023-Latin America (current)
2D to 3D for all roles	Help centers who are just starting with 3D EBRT, from A-Z for all staff.	<ul style="list-style-type: none"> ● 2020-Middle East ● 2021-Southeast Asia
Contouring for ROs	H&N case-based learning: GTV, nodal station selection and delineation, and practice with plan review. Currently expanding to other disease sites.	<ul style="list-style-type: none"> ● 2020-Philippines ● 2021-Southeast Asia ● 2023-Southeast Asia
Hypofractionation for MPs, ROs	Covers breast, prostate, rectal, and CNS disease sites, providing practical guidance on how to correctly perform hypofractionation protocols.	<ul style="list-style-type: none"> ● 2021-Colombia ● 2023-Latin America

Global impact of RCC's work

Participation

5300+ participants

1500+ clinics

240+ volunteers

Measuring Success

Confidence (*approx. +23%*)

Knowledge (*approx. +30%*)

Satisfaction (*~9.6/10*)

“the whole idea of the training courses is incredible. the sessions are very informative and cover exactly what I need to learn... I am really grateful and thankful for all the great effort.” - 2022 *medical physicist participant*

Additional partnerships



RCC-developed targeted training programs

WUSTL - Guatemala/INCAN IMRT training

BVGH - African Access to Cancer Care initiative in Sub-Saharan Africa + RCC education

LATAM RT Society Presidents - Hypofractionation training for the whole country, across each country in LATAM.

Southeast Asia Radiation Oncology Group (SEAROG) - Contouring training programs for all member countries

RCC-provided material

WUSTL

- Uganda Cancer Institute IMRT training
- Mongolia National Cancer Institute IMRT training

AAPM

- Alexandria HDR Brachytherapy
- Libya 2D to 3D EBRT transition (upcoming Spring 2024)

Individual agents

- Relief effort to Ukraine + IMRT for RTTs

Key Takeaways



1. It is a challenge to address global radiotherapy educational needs.
 - a. High demand: ~1100 participants in our SBRT/SRS course in Latin America!
 - b. Materials applicable to professionals in LMICs
2. If we establish team roles, we can clearly fill gaps and work together. We have identified the team role of “RT education” and are working hard to fill this gap.
3. There is a great need for more resources, especially 24/7 access to radiotherapy training materials.
4. We continue to build our network of participants and volunteers to lay the groundwork for future collaborations.

References



1. Velarde, A., Najera, K. D., Gay, H., Powderly, W. G., Mutic, S., Green, J., Michalski, J. M., Henke, L., de Falla, V., Laugeman, E., Catu, M., Hugo, G. D., Cai, B., & van Rheenen, J. (2020). Taking Guatemala From Cobalt to IMRT: A Tale of US Agency Collaboration With Academic Institutions and Industry. *International journal of radiation oncology, biology, physics*, 107(5), 867–872. <https://doi.org/10.1016/j.ijrobp.2020.04.001>
2. Abdel-Wahab M, Fidarova E, Polo A. Global access to radiotherapy in low- and middle-income countries. *Clin Oncol* 2017;29:99-104.
3. Afua Yorke, Caroline Carlson, Sherareh Koufigar, Hong Zhu, Benjamin Li. Re-Imagining Education in Global Radiotherapy – The experiences and contribution of Rayos Contra Cancer (RCC). *JCO Global Oncology*, no. 9 (2023) e2200320. Published online April 12, 2023. PMID: 37043712