

# Estándar Internacional en Radioterapia Oncológica versus realidad Chilena

## Nicolás Isa Oncólogo Radioterapeuta



# Introducción

El cáncer es una agrupación de enfermedades no transmisibles, y causa importante de morbilidad y muerte.

- •Incidencia 182 personas cada 100.000 hab. (1)
- •Mortalidad 102 personas cada 100.000 hab.(1)
- •Prevalencia del año 2012: (1)
  - 8,7 millones de personas diagnosticadas hace 1 año
  - -22 millones de personas diagnosticadas hace 3 años
  - -32,6 millones de personas diagnosticadas hace a 5 años

<sup>1.</sup> Ferlay J, Soerjomataram I, Ervik M et al. (2013). GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11 [Internet]. Lyon:IARC. Available at <a href="http://globocan.iarc.fr">http://globocan.iarc.fr</a>.

# Introducción

35 Estados que conforman la OCDE

- •Expectativa de vida al nacer al año 2015: (2)
  - -83,9 años en Japón
  - -57,4 en Sudáfrica
  - **-79,1** en Chile
- •Mortalidad por cáncer en el año 2014: (3)
  - -114,6 por cada 100.000 habitantes en Méjico
  - -282,7 por cada 100.000 habitantes en Hungría
  - -193,9 por cada 100.000 habitantes en Chile

# Introducción

- El año 2016 los países invirtieron en promedio por habitante en salud (aportes personales/particulares en USD) (4)
  - 9.892 USD en EEUU
  - 1.080 USD en Méjico
  - 1.977 USD para Chile
- Chile son quivalentes a 2.100 millones USD año 2009 (5)
  - 12,9% de ellos representan gasto en Cáncer según el Foro Nacional de Cáncer de Chile,
- Países de alto ingresos (6)
  - 5-10% del presupuesto de Salud es destinado a Cáncer
  - 0,5-1% a Radioterapia Oncológica

## **Contexto**

- En el curso del cáncer, el 60% de los pacientes va a requerir tratamientos de Radioterapia de intención curativa o paliativa<sup>(9)</sup>.
- Para esto se necesita equipamiento y recursos humanos.
- El estándar Europeo:
  - 1 OR por cada 130-300 pacientes nuevos por año<sup>(11)</sup>
  - 1 LINAC cada 250-400 pacientes<sup>(12)</sup>
  - 1 LINAC no debiera exceder los 10 años de funcionamiento para no ser catalogado como obsoleto<sup>(12)</sup>

<sup>11.</sup> Radiother Oncol 2014;112:178-86.

<sup>12.</sup> Radiother Oncol 2014;112:165-177

## **Contexto**

### Cáncer en el Mundo

- Contextualizándolo a las necesidades de RO, es importante saber cómo se enfrentan y preparan los países con mejores índices de diagnóstico, tratamiento y sobrevida
- Como distribuyen a sus médicos OR, con qué equipamiento cuentan, cuál es su visión de futuro respecto a esta problemática global
- Contrastarla con la realidad Chilena y encontrar soluciones a esta con el fin de contribuir a la salud pública nacional



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### Overview

### Analysis of Global Radiotherapy Nee Region and Income Level

E. Zubizarreta\*, J. Van Dyk†, Y. Lievens†

International Atomic Theogy Agency Vienna, Austria Western University London, Ontario, Canado

Reduction Charlegy Department, Chent University Hospital and

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### ESTRO-HERO survey

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### Rescuing Spanish Radiation Therap Leadership and Opportunity

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Pedro Jose Prada, \* Julia Muñoz, \* Meritxell Arena ESTRO-HERO SUNYAY Hector Perez-Montero \*\*

\*Budiation Oscology Department, Hospital Universitario de Gran Cass Gran Canaria, Spoise: Madiation Oscology Department, Hospital Robert Padiation Oscology Department, Compleje Hospitalario de Castellón, Oscology Department, Clinica Universitario de Noverra, Primplana, Sp Department, Hospital Universiturio Maravés de Valdecilla, Santander Description and Hagailtal Halas ecitoria Infrasts Cristians Andrian Confe-Department, Hospital Universitatio Septian Orbita, Badejac, Spelo; \*
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### The Spanish Health System and Radiation

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Radiotherapy equipment and departments in the European countries; Final results from the ESTRO-HERO survey

Cai Grau<sup>4,4</sup>, Noémie Defourny <sup>9</sup>, Julian Malido Ben Slotman <sup>8</sup>, Marta Bogusz <sup>9</sup>, Chiara Gasparo



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# Métodos

Catastro nacional por auditoría directa con todos los jefes de Servicios

Se solicitó la siguiente información:

- Población beneficiaria que es atendida
- Número de OR con los que cuentan, horario disponible para atención clínica
- LINACs con los que cuentan y su año de inicio de funcionamiento o del último "upgrade" realizado
- Total de tratamientos realizados de Radioterapia externa durante el año 2017, tanto de intención curativa como paliativa

### Al año 2018

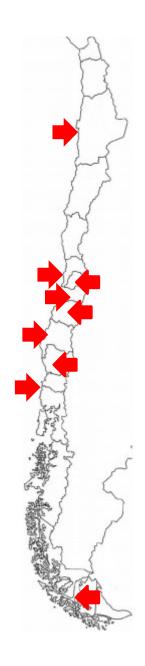
- 22 Centros de Radioterapia públicos y privados
- 41 LINACs operativos
- 81 Médicos Oncólogos Radioterapeutas activos

Esto significa que si consideramos la población Chilena en 17.574.003 habitantes<sup>(14)</sup>

- 2,33 LINACs por millon de habitantes
- 4,6 ORs por millón de habitantes

## Realidad

• Hay 74 ORs full time, es decir 4,21 ORs por cada millón de habitantes



LINACs y OR por Región/es por millones de habitantes en Chile

Región/es	LINACs	ORs nominales	ORs reales
Arica y Parinacota,	1,38	3,45	2,24
Tarapacá,			
Antofagasta,			
Atacama			
Coquimbo,	2,2	3,85	3,85
Valparaíso			
Metropolitana,	2,99	6,6	5,95
O Higgins			
Maule	0,95	2,87	2,87
Biobío	2,45	2,94	2,94
Araucanía	2,09	2,09	2,09
Los Ríos, Los Lagos,	1,52	1,75	1,32
Aisén			
Magallanes	6	6	6
Total nacional	2,33	4,6	4,21

<sup>\*</sup>bajo el promedio de los países europeos de 5,3 LINACs por cada millón de habitantes (15)

Año 2017 se realizaron 16.282 tratamientos de Radioterapia con 74 ORs a tiempo completo

 1 OR trata en promedio 220 pacientes anuales, dentro del estándar europeo de 130 a 300 pacientes por año<sup>(11)</sup>

La IAEA estima que deben existir al menos 1,7 LINACs por cada 1000 tratamientos anuales en un país en vías de desarrollo y 2,3 LINACS por cada 1000 pacientes en un país desarrollado<sup>(16)</sup>

Chile con 41 LINACs para 16.282 tratamientos

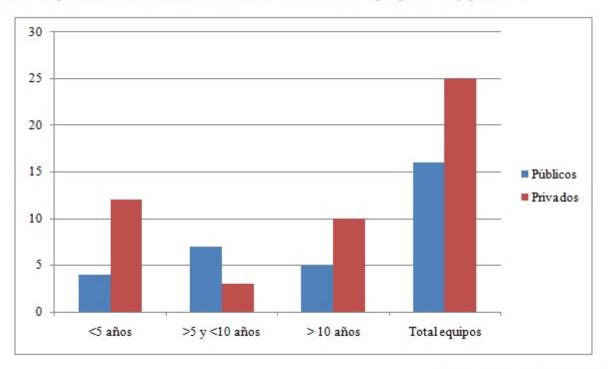
2,51 LINACs cada 1000 tratamientos

### Estos 41 LINACs operativos

• 1 LINAC cada 397 pacientes por equipo anual, dentro del límite superior del estándar Europeo de 250 a 400 pacientes<sup>(12)</sup>, y al promedio Europeo de 419 pacientes<sup>(15)</sup>.

- 11. Radiother Oncol 2014;112:178-86.
- 12. Radiother Oncol 2014;112:165-177
- 15. Radiother Oncol 2014;112:155-164
- 16. Clin Oncol (R Coll Radiol) 2017;29:99-104

Años operativos de los LINACs en Centros de Radioterapia públicos y privados



Fuente: elaboración propia

De estos 41 LINACs, 15 de ellos han estado operativos más de 10 años, por lo que podrían ser considerados obsoletos<sup>(12)</sup>

Chile incidencia estimada de cáncer de 216.9 personas cada 100.000 habitantes<sup>(17)</sup>

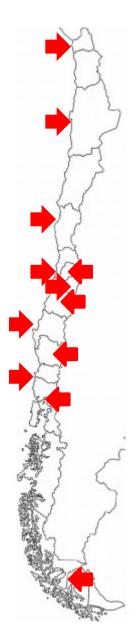
- Población actual de 17.574.003 habitantes
- Debiesen haber 38.118 casos nuevos anuales de cáncer
- 60% requiere Radioterapia<sup>(9)</sup>
- 22.870 pacientes nuevos posibles para Radioterapia
- Año 2017 se hicieron 16.282 tratamientos
- Déficit mínimo de 6.588

<sup>9.</sup> Cancer. 2005;104(6):1129-1137.

<sup>17.</sup> Diagnóstico epidemiológico del cáncer en Chile 2018. Departamento de Cáncer División de Prevención y Control de Enfermedades Subsecretaría de Salud Pública, Ministerio de Salud Chile. <a href="http://www.minsal.cl/">http://www.minsal.cl/</a>

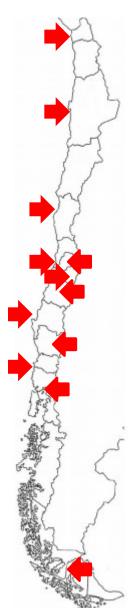
## De acuerdo a los números anteriores

- 1 OR trataría en promedio 309 pacientes anuales, sobre el límite superior de máximo 300<sup>(11)</sup>,
- 1,79 LINACs por cada 1000 tratamientos, más parecido a un país en vías de desarrollo<sup>(16)</sup>
- 1 LINAC trataría anualmente a 558 pacientes, muy por sobre el máximo de 400 <sup>(12)</sup> o la mediana de países Europeos de 419<sup>(15)</sup>
- Esto puede ser aún peor ya que un 25% de los pacientes requiere nuevos tratamientos paliativos en países desarrollados<sup>(18).</sup>
- 11. Radiother Oncol 2014;112:178-86.
- 12. Radiother Oncol 2014;112:165-177
- 15. Radiother Oncol 2014;112:155-164
- 16. Clin Oncol (R Coll Radiol) 2017;29:99-104
- 18. Radiother Oncol 2015;116:35-37



Estimado nacional de necesidad de tratamientos de Radioterapia, Oncólogos Radioterapeutas y LINACS por Región/es

Total	17.574.003	22.870	81	74	80	41	62		
Magallanes	166.533	217	1	1	1	1	1	217	217
2 .									
Los Lagos y Aisén	931.866	1213	0	0	5	0	4	243	304
Los Ríos	384.837	501	4	3	2	2	2	250	250
Araucanía	957.224	1246	2	2	5	2	4	250	312
Biobío	2.037.414	2652	6	6	9	5	7	295	379
Maule	1.044.950	1360	3	3	5	1	4	272	340
O´ Higgins	914.555	1191	1	1	4	1	3	298	397
Metropolitana	7.112.808	9257	52	47,75	31	23	24	298	386
Valparaíso	1.815.902	2364	7	7	8	4	6	296	394
Coquimbo	757.586	986	0	0	4	0	3	247	329
Antofagasta	607.534	791	5	3,25	3	2	2	264	396
Tarapacá									
Arica y Parinacota	556.626	725	0	0	3	0	2	242	363
		Radioterapia							
Región	Habitantes	Estimado de Casos que requieren	N° actual de OR	N° real actual de OR	N° OR necesarios	N° actual de LINACs	N° LINACs necesarios	Estimado Tratamientos por OR	Estimado Tratamientos por LINAC



Estimado nacional de necesidad de tratamientos de Radioterapia, Oncólogos Radioterapeutas y LINACS por Región/es

Total	19.128.758	24.894	81	74	88	41	68		
Magallanes	181.266	236	1	1	1	1	1	236	236
Los Lagos y Aisén	1.014.307	1320	0	0	5	0	4	264	330
Los Ríos	418.883	545	4	3	2	2	2	272	272
Araucanía	1.041.909	1356	2	2	5	2	4	272	339
Biobío	2.217.662	2886	6	6	10	5	8	289	361
Maule	1.137.396	1481	3	3	5	1	4	297	371
O ' Higgins	995.465	1296	1	1	5	1	4	260	324
Metropolitana	7.742.071	10.076	52	47,75	36	23	26	280	388
Valparaíso	1.976.553	2573	7	7	9	4	7	286	368
Coquimbo	824.609	1074	0	0	4	0	3	269	358
Antofagasta	661.282	861	5	3,25	3	2	3	287	287
Tarapacá									
Arica y Parinacota	605.871	785	0	0	3	0	2	262	393
		Radioterapia							
Región	Estimado de Habitantes año 2025	Estimado de Casos que requieren	N° actual de OR	N° real actual de OR	N° OR necesarios año 2025	N° actual de LINACs	N° LINACs necesarios año 2025	Estimado Tratamientos por OR	Estimado Tratamientos por LINAC

### Año 2018:

80 ORs a tiempo completo y se cuenta con 74
 Se necesitarían 21 nuevos LINACs, es decir 62 totales

Hacia el año 2025 (población de 19.128.758<sup>(19)</sup>)

 Se necesitarían 27 nuevos LINACs, es decir 68 totales y un mínimo de 88 ORs dedicados a tiempo completo a la clínica

# Conclusiones

## Infraestructura:

- Más y más nuevos LINACs para superar el déficit
- Renovar los obsoletos y combatir la obsolescencia de forma programada
- Actualmente contamos con 22 Centros de Radioterapia, los que se encuentran concentrados en 8 centros poblacionales
- Idealmente debiesen alcanzar a 12 centros poblacionales

# Conclusiones

En cuanto a Oncólogos Radioterapeutas:

- Su déficit puede ser solucionado con la formación de nuevos especialistas
- Distribuirlos según necesidad en las nuevas zonas geográficas
- Pasar de 74 a 80 ORs dedicados tiempo completo
- Proyectados a 88 ORs para el año 2025

# Gracias

