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The Development of a Standardized Software Platform to Support Provincial Population-Based Cancer Outcomes Units for Multiple Tumour Sites

OaSIS: Outcomes & Surveillance Integration System

BCCA Annual Cancer Conference 2011

Jonn Wu, BMSc MD FRCPC

Radiation Oncologist, Vancouver Cancer Centre

Clinical Assistant Professor, UBC

Conflict of Interest Disclosure

OaSIS Project: Research Grants and Funding from Industry

- Roche Canada
- Eli Lilly Canada
- Bristol-Myers Squibb Canada
- Boehringer Ingelheim

Personal Conflicts: Nil.



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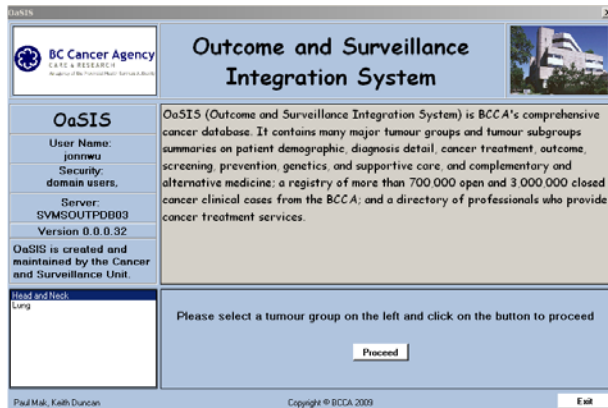
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Cancer Outcomes & OaSIS - Outline



The Importance of Outcomes Research
Limitations of Current Outcomes Databases
OaSIS – What is it?
OaSIS – Implementation Plan
Summary



Why is Outcomes Research Important?



*Those who cannot remember the past,
are condemned to repeat it.*

-George Santayana
Reason in Common Sense, 1905



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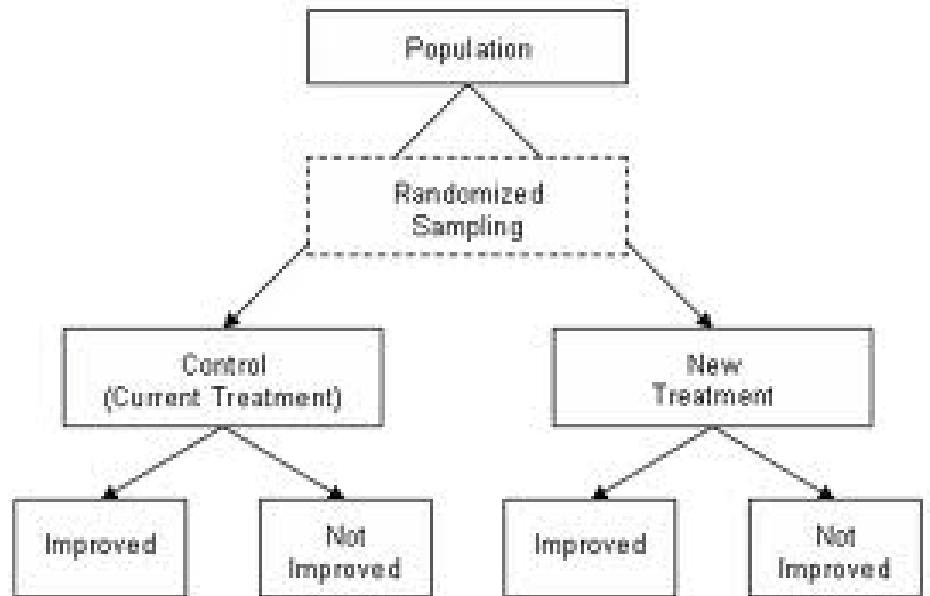
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Why is Outcomes Research Important?

Clinical Trials

How do we know what we're doing really works?

- Patient characteristics
- Local practices
- Different disease
- Side effects



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Why doesn't everyone have an outcomes database?

Software
Data Entry

Software Programming
Data QA
Biostatistical Support

Software Maintenance
Data Maintenance
Administrative Tasks

Expensive

Expertise

Labour Intensive



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Limitations of “Databases”

Software
Single User
Limited Security
Single Discipline
Limited Data Entry
Biostatistics = afterthought



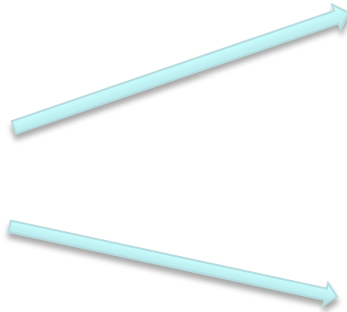
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What did we want?

Proper Software Platform
Data Entry: multiple routes
Admin/Research Structure
Access to Biostatistics



Multi-centre (**Provincial**)
(**Population Based**)
Multi-user, **Multi-disciplinary**
Customized **Security** Access
Scalable

HRA Data Entry
Clinician Data Entry
Patient Data Entry
Direct Data Linkages

COMPLETE PACKAGE!

OaSIS

Outcomes and Surveillance Integration System

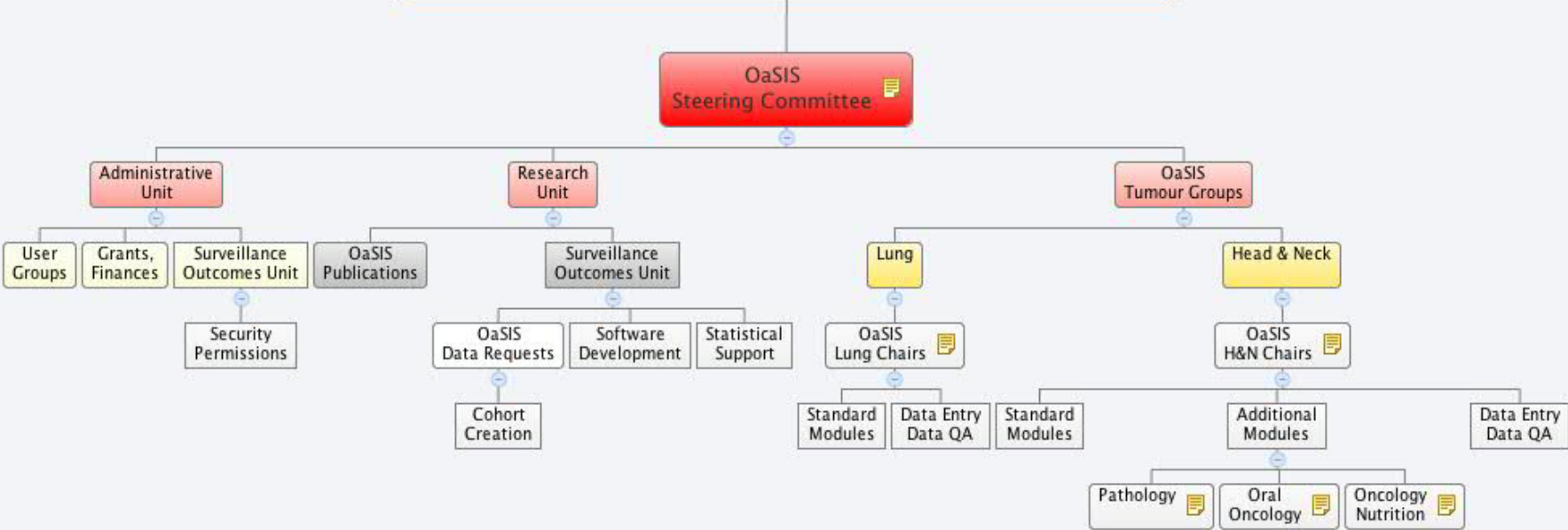


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OaSIS Outcomes and Surveillance Integrated Systems Administration Map



OaSIS: Implementation Plan



Phase I: Integrating Clinical Databases

Phase II: Radiotherapy Dosimetric Repository

Phase III: Survivorship, Research Unit

Phase IV: Expansion



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OaSIS: Phase I – Integrating Clinical Databases

- 2008 – Inception
- 2009 – HN & Lung Tumour Groups
 - Multiple Disciplines
 - Oncologists
 - Surgeons
 - Oral Oncologists
 - Pathologists
 - Oncology Nutrition
 - PFC
- **2010 – Software Development**
- 2011 – Data Dictionaries, Data Entry (May)
 - Five Studies




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OaSIS: Phase I – Current Status

OaSIS



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Outcome and Surveillance Integration System



OaSIS

User Name: jonnwu

Security: domain users.

Server: SVMSOUTPDB03

Version 0.0.0.32

OaSIS is created and maintained by the Cancer and Surveillance Unit.

OaSIS (Outcome and Surveillance Integration System) is BCCA's comprehensive cancer database. It contains many major tumour groups and tumour subgroups summaries on patient demographic, diagnosis detail, cancer treatment, outcome, screening, prevention, genetics, and supportive care, and complementary and alternative medicine; a registry of more than 700,000 open and 3,000,000 closed cancer clinical cases from the BCCA; and a directory of professionals who provide cancer treatment services.

Head and Neck
Lung

Please select a tumour group on the left and click on the button to proceed

Proceed

Paul Mak, Keith Duncan

Copyright © BCCA 2009

Exit

OaSIS: Phase I – The Modules

Completed:

- Staging, Risk Factors
- Follow-Up (Clinical Outcomes)
- Radiotherapy (basic)
- Chemotherapy
- Oncology Nutrition
- PSCAN, HAF

Pending:

- Pathology (Histology, Molecular Markers)
- Oral Oncology
- Survivorship, QOL



LUNG STAGING DIAGRAM

	N0	N1	N2	N3
T1a (≤2cm)	IA	IIA	IIIA	IIIB
T1b (>2-3cm)	IA	IIA	IIIA	IIIB
T2a (>3-5cm)	IB	IIA	IIIA	IIIB
T2b (>5-7cm)	IIA	IIB	IIIA	IIIB
T3 (>7cm)	IIIB	IIIA	IIIA	IIIB
Invasion	IIIB	IIIA	IIIA	IIIB
Same lobe nodules	IIIB	IIIA	IIIA	IIIB
T4 Extension	IIIA	IIIA	IIIB	IIIB
Ipsilateral lung	IIIA	IIIA	IIIB	IIIB
M1a Pleural effusion	IV	IV	IV	IV
Contra lateral lung	IV	IV	IV	IV
M1b Distant	IV	IV	IV	IV

UNIT _____

AGENCY CHART No. _____

SURNAME _____ GIVEN NAME _____

D.O.B. _____ HEALTH CARE PLAN No. _____

- N3 Supraclavicular
 - 1 Highest Mediastinal
 - 2 Upper Paratracheal
 - 3 Pre-vascular & Retrotracheal
- N2
 - 4 Lower Paratracheal (including Azygos Nodes)
 - 5 Subaortic (A-P window)
 - 6 Para-aortic (ascending aorta or phrenic)
 - 7 Subcarinal
 - 8 Paraesophageal (below carina)
 - 9 Pulmonary Ligament
- N1
 - 10 Hilal
 - 11 Interlobar
 - 12 Lobar
 - 13 Segmental
 - 14 Subsegmental

- NEW** Referred as part of definitive treatment (initial treatment of disease)
- RECURRENT DISEASE** Definitive treatment already received. Referred at recurrence.
- REFERRED FOR FOLLOW-UP** Previously treated and followed elsewhere before referral.

TNM 2009	T	X	0	is	1a	1b	2a	2b	3	4
Clinical	N	X	0		1		2		3	
	M	X	0		1a	1b				
TNM 2009	T	X	0	is	1a	1b	2a	2b	3	4
Pathological	N	X	0		1		2		3	
	M	X	0		1a	1b				

Small Cell Clinical 1995 Limited Extensive

Site	<input type="checkbox"/> RUL <input type="checkbox"/> RML <input type="checkbox"/> RLL <input type="checkbox"/> R hilum <input type="checkbox"/> LUL <input type="checkbox"/> LLL <input type="checkbox"/> L hilum <input type="checkbox"/> Unknown	ECOG	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4
Primary tumor resected	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Weight loss within 3 months prior to diagnosis	<input type="checkbox"/> <5% <input type="checkbox"/> 5-10% <input type="checkbox"/> >10%
Post-operative residual tumor	<input type="checkbox"/> R0 <input type="checkbox"/> R1(Microscopic) <input type="checkbox"/> R2(Macroscopic) <input type="checkbox"/> Unknown	Smoking status	<input type="checkbox"/> Never (<100 cig/life) <input type="checkbox"/> Former <input type="checkbox"/> Current/quit<1yr
Maximum tumor size (mm)		Pack years	
Type	<input type="checkbox"/> SCLC <input type="checkbox"/> NSCLC <input type="checkbox"/> Mixed	Brain imaging within 3 months of diagnosis	<input type="checkbox"/> Yes <input type="checkbox"/> No
Histology		PET within 3 months of diagnosis	<input type="checkbox"/> Yes <input type="checkbox"/> No
Grade	<input type="checkbox"/> Well <input type="checkbox"/> Moderately <input type="checkbox"/> Poorly <input type="checkbox"/> Undifferentiated <input type="checkbox"/> Unknown	Metastasis (check all that apply)	<input type="checkbox"/> Lung <input type="checkbox"/> Bone <input type="checkbox"/> Liver <input type="checkbox"/> Brain <input type="checkbox"/> Distant nodes <input type="checkbox"/> Pleura <input type="checkbox"/> Peritoneum <input type="checkbox"/> Adrenal <input type="checkbox"/> Skin <input type="checkbox"/> Other

Completed by: _____ Date: _____

Diagnosis/Stage amended to: _____

Reason: _____

By: _____ Date: _____

NOTIFY DATA QUALITY AND REGISTRY IF DIAGNOSIS/STAGE IS AMENDED

OaSIS: Phase I – Staging Module

OaSIS - Lung

welcome back jonnuw no access read only read write
bcc_a_oasis_lu_chair, bcc_a_oasis_lu_radon

Lung

patient health assessment haf nutrition psychological screening disease staging systemic therapy radiation therapy outcome

agency id go surname first name

disease profile

site #	tumour grp	tumour subgrp	dx date	site admit date	laterality	site	site description	hist1	hist1 description

status at referral small cell clinical 1995 grade clinical

t	n	m	rev. yr.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

metastasis

date of conf	smp description	site	site description	method conf

surgical /pathology

t	n	m	rev. yr.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ECOG 0 1 2 3 4

additional information

primary tumour resected yes no unknown not-applicable

post-operative residual tumour R0 R1 R2 unknown not-applicable

weight loss within 3 months prior to diagnosis <5% 5-10% >10% unknown

smoking status never (<100 cig/life) unknown former former/unk pack years current/quits<1 yr current/unk pack years

pack years

asian specified or not specified asian-spe asian-non-spe other-spe unknown

amended reason

brain imaging within 3 months of diagnosis yes no

PET imaging within 3 months of diagnosis yes no

metastasis

lung bone liver

brain distant nodes MetastasisName

pleura peritoneum

adrenal skin

other

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LUNG STAGING DIAGRAM

UNIT _____
AGENCY CHART No. _____
SURNAME _____ GIVEN NAME _____
D.O.B. _____ HEALTH CARE PLAN No. _____

	N0	N1	N2	N3	
T1a (<2cm)	IA	IA	IIA	IIIB	N0 Supraclavicular 1 Highest Mediastinal 2 Upper Paratracheal 3 Pre-vascular & Retrotracheal 4 Lower Paratracheal (including Azygos Nodes) 5 Subaortic (A-P window) 6 Para-aortic (ascending aorta or phrenic) 7 Subcarinal 8 Paraesophageal (below carina) 9 Pulmonary Ligament 10 Hilar
T1b (>2-3cm)	IA	IIA	IIA	IIIB	
T2a (>3-5cm)	IB	IIA	IIA	IIIB	
T2b (>5-7cm)	IIA	IIA	IIA	IIIB	
T3 (>7cm)	IIIB	IIA	IIA	IIIB	N2 11 Intraobar 12 Lobar 13 Segmental 14 Subsegmental
Invasion	IIIB	IIA	IIA	IIIB	
Same lobe nodules	IIIB	IIA	IIA	IIIB	
Extension	IIIA	IIA	IIIB	IIIB	
Ipsilateral lung	IIIA	IIA	IIA	IIIB	
Pleural effusion	IV	IV	IV	IV	
Contralateral lung	IV	IV	IV	IV	
M1a Distant	IV	IV	IV	IV	

NEW Referred as part of definitive treatment (initial treatment of disease?)

RECURRENT DISEASE Definitive treatment already received. Referred at recurrence.

REFERRED FOR FOLLOW-UP Previously treated and followed elsewhere before referral.

TNM 2009	T	X	0	1a	1b	2a	2b	3	4
Clinical	N	X	0	1	2	3			
	M	X	0	1a	1b				

TNM 2009	T	X	0	1a	1b	2a	2b	3	4
Pathological	N	X	0	1	2	3			
	M	X	0	1a	1b				

Small Cell Clinical 1995 Limited Extensive

Site	ECOG	Weight loss within 3 months prior to diagnosis	Smoking status	Brain imaging within 3 months of diagnosis	PET within 3 months of diagnosis	Metastasis (check all that apply)
<input type="checkbox"/> RUL <input type="checkbox"/> RML <input type="checkbox"/> RLL <input type="checkbox"/> LUL <input type="checkbox"/> LLL <input type="checkbox"/> LLU <input type="checkbox"/> LLL <input type="checkbox"/> Unknown	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4	<input type="radio"/> <5% <input type="radio"/> 5-10% <input type="radio"/> >10%	<input type="radio"/> Never (<100 cig/life) <input type="radio"/> Former <input type="radio"/> Current/quits<1yr	<input type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Yes <input type="radio"/> No	<input type="checkbox"/> Lung <input type="checkbox"/> Bone <input type="checkbox"/> Liver <input type="checkbox"/> Brain <input type="checkbox"/> Distant nodes <input type="checkbox"/> Pleura <input type="checkbox"/> Peritoneum <input type="checkbox"/> Adrenal <input type="checkbox"/> Skin <input type="checkbox"/> Other

Completed by: _____ Date: _____
Diagnosis/Stage amended to: _____
Reason: _____
By: _____ Date: _____
NOTIFY DATA QUALITY AND REGISTRY IF DIAGNOSIS/STAGE IS AMENDED

T16-51 Revised 2009_08

OaSIS: Phase I – Nutrition Module

OaSIS - Head and Neck

welcome back jonnwu

Head and Neck

no access read only read write
bcca_oasis_hn_chair, bcca_oasis_hn_radon

patient health assessment **haf nutrition** nutrition assessment psychological screening disease staging systemic therapy radiation therapy outcome pathology

assess on	created by	summary
-----------	------------	---------

last name first name

collected on agency id

first nutrition contact
 yes no

when assessed
 pretreatment during treatment post treatment

anthropometrics

height cm (numeric value only)

weight at new patient visit kg (numeric value only)

current weight kg (numeric value only)

current BMI % weight change

feeding tube
 yes no

tube type
 nasogastric gastric
 other

use
 prophylactic therapeutic

where
 inpatient outpatient
 outside boca

date of use

date of last use

number of days feeding tube in use

Delete Save

Back to the Main Menu Exit

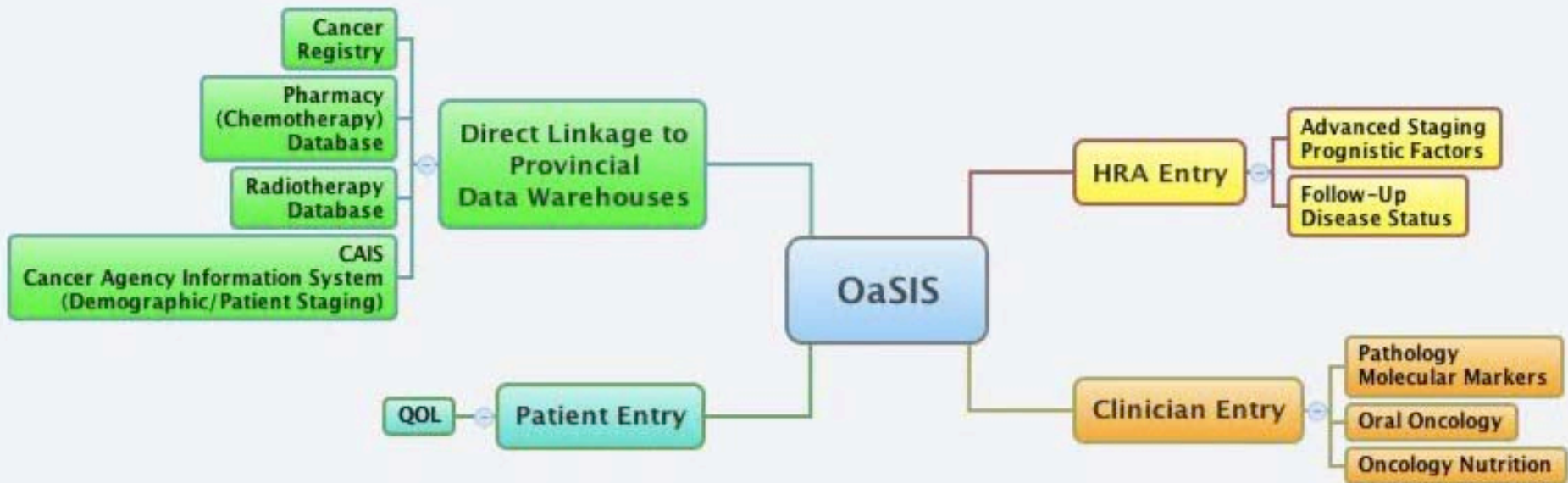


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OaSIS: Phase I – Data Entry



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OaSIS: Phase I – Chemotherapy Module

OaSIS - Lung

welcome back pmak

no access read only read write developer

oasis patient cais systemic therapy radiation therapy health assessment nutrition screening psychological screening staging diagram follow up

surname first nam agency id

patient prescription profile

first dispense	last dispense	protocol	drug
09 Dec 2005	30 Mar 2006		CARBOPLATIN
09 Dec 2005	06 Apr 2006	LUAVPG	GEMCITABINE
17 Oct 2006	19 Dec 2006	LUAVDOC	DOCETAXEL

prescription detail

pres. date	protocol	drug	dose	route	in/out	hospital
09 Dec 2005	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...
09 Dec 2005		CARBOPLATIN	400 mg	IV	0	Powell River Gen H...
16 Dec 2005	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...
04 Jan 2006	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...
04 Jan 2006		CARBOPLATIN	400 mg	IV	0	Powell River Gen H...
12 Jan 2006	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...
26 Jan 2006	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...
26 Jan 2006		CARBOPLATIN	400 mg	IV	0	Powell River Gen H...
02 Feb 2006	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...
16 Feb 2006	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...
16 Feb 2006		CARBOPLATIN	400 mg	IV	0	Powell River Gen H...
23 Feb 2006	LUAVPG	GEMCITABINE	1600 mg	IV	0	Powell River Gen H...

chemo course

course	drug
1	NEW

additional information

course number

first dispense date

last dispense date

number of cycle days per cycle

protocol

drug(s)

intent

best response

toxicity during or within 1 month of last cycle of chemotherapy administered

date of progression (e.g. 15 Mar 2009)

documentation of progression



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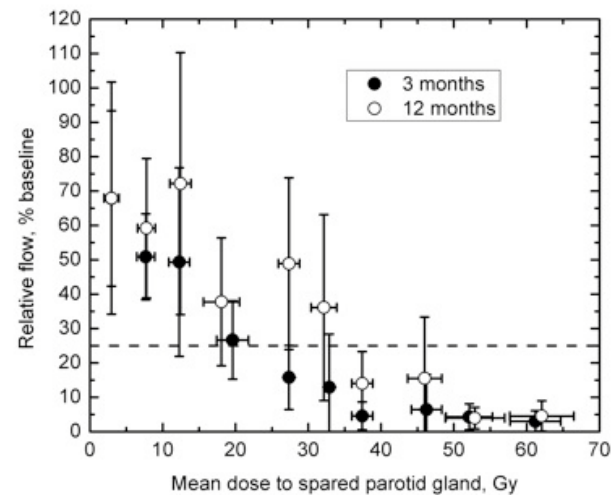
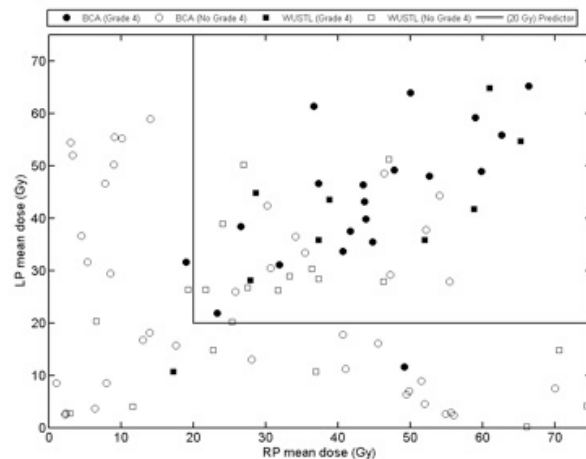
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Phase II: Radiotherapy Dosimetric Repository

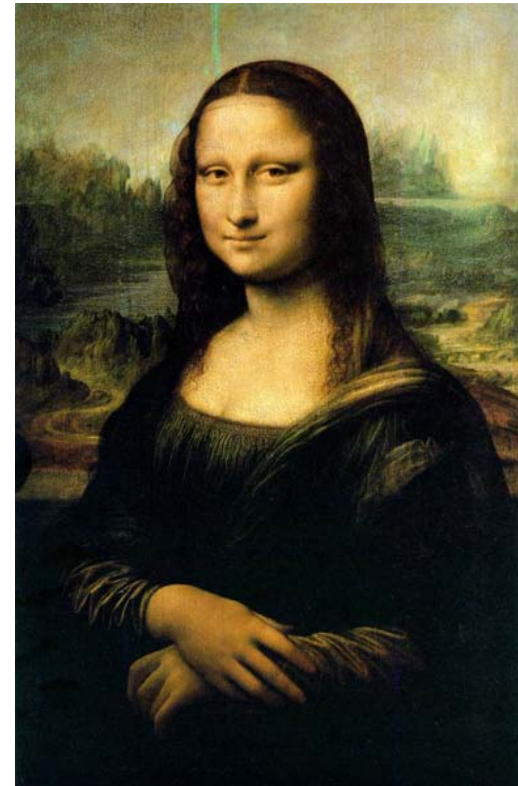
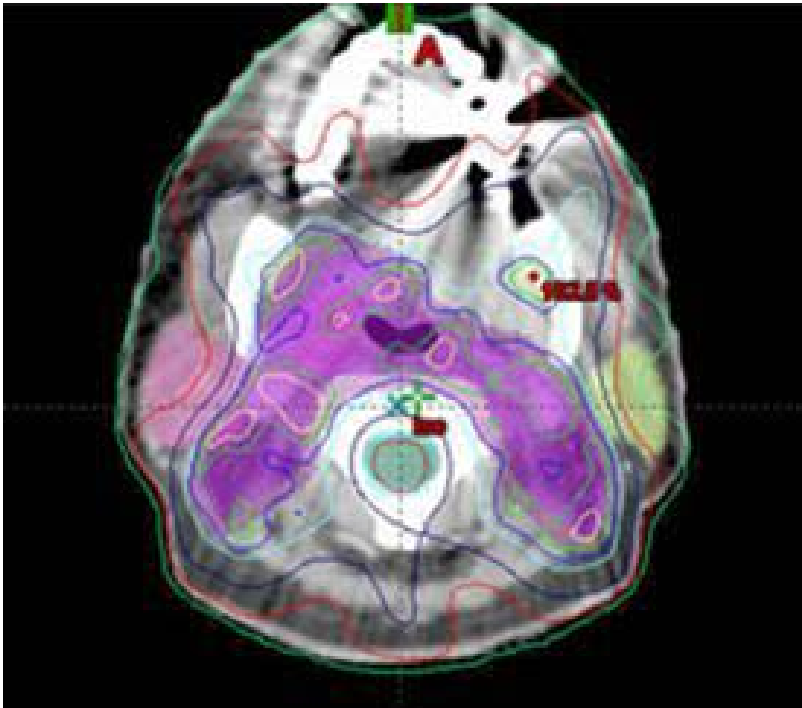
Current Radiotherapy Data Captured:

- Start date, end date
- Prescription dose (to tumour)
- Average or max doses to critical structures



Phase II: Radiotherapy Dosimetric Repository

What's wrong with basic radiotherapy variables?



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OaSIS: Phase III – Survivorship, Research Unit

Patient Generated QOL Tools

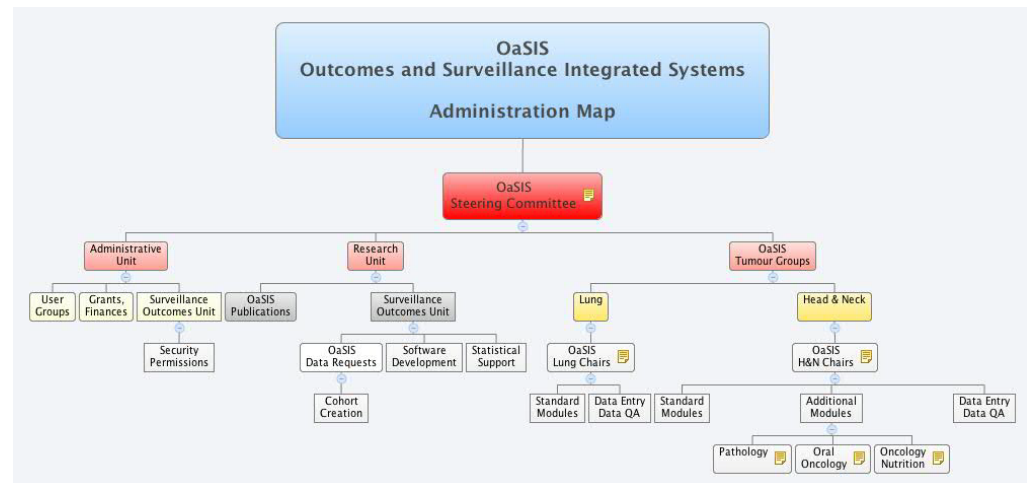
Query Tool (Report Builder)

QA Team

Biostatistical Support

Data Requests Committee

Application Process



OaSIS: Phase IV - Expansion

Other Tumour Groups

Genome Sciences Group

Tumour Tissue Repository

Synoptic Surgical Reports

Synoptic Pathology Reports

Provincial Tumour Marker/Laboratories

Clinical Information external to BCCA

Operations Research





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OaSIS Summary

The screenshot shows the OaSIS web application interface. At the top left is the BC Cancer Agency logo and name. The main title is "Outcome and Surveillance Integration System". Below this, there is a section for "OaSIS" with details: User Name: jonnu, Security: domain users, Server: SVMSOUTPDB03, and Version 0.0.0.32. A description of OaSIS is provided: "OaSIS (Outcome and Surveillance Integration System) is BCCA's comprehensive cancer database. It contains many major tumour groups and tumour subgroups summaries on patient demographic, diagnosis detail, cancer treatment, outcome, screening, prevention, genetics, and supportive care, and complementary and alternative medicine; a registry of more than 700,000 open and 3,000,000 closed cancer clinical cases from the BCCA; and a directory of professionals who provide cancer treatment services." Below this, there is a section for "Head and Neck" with a list of "Lung". A "Proceed" button is visible. At the bottom, there is a footer with "Paul Mak, Keith Duncan", "Copyright © BCCA 2009", and an "Exit" button.

 BC Cancer Agency CARE + RESEARCH <small>An Agency of the Provincial Health Services Authority</small>	<h2>Outcome and Surveillance Integration System</h2> 
OaSIS	<p>OaSIS (Outcome and Surveillance Integration System) is BCCA's comprehensive cancer database. It contains many major tumour groups and tumour subgroups summaries on patient demographic, diagnosis detail, cancer treatment, outcome, screening, prevention, genetics, and supportive care, and complementary and alternative medicine; a registry of more than 700,000 open and 3,000,000 closed cancer clinical cases from the BCCA; and a directory of professionals who provide cancer treatment services.</p>
User Name: jonnu	
Security: domain users.	
Server: SVMSOUTPDB03	
Version 0.0.0.32	
OaSIS is created and maintained by the Cancer and Surveillance Unit.	
Head and Neck Lung	<p>Please select a tumour group on the left and click on the button to proceed</p> <p><input type="button" value="Proceed"/></p>
Paul Mak, Keith Duncan	Copyright © BCCA 2009 <input type="button" value="Exit"/>

The OaSIS Project will provide a powerful and customizable, integrated multidisciplinary infrastructure to support outcomes research.

Acknowledgements

OaSIS Steering Committee
HN & Lung Tumour Groups

Private Donors

Eleni Skalbania Endowment For Lung Cancer Research

Michael Smith Foundation
BCCF Ride to Conquer Cancer

Industry:

- Roche Canada
- Eli Lilly Canada
- Bristol-Myers Squibb Canada
- Boehringer Ingelheim



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