

Bladder Cancer Clusters in Florida: Identifying Populations at Risk

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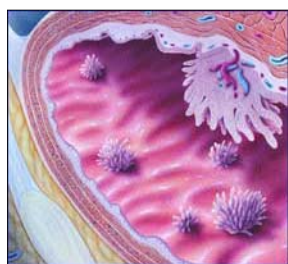
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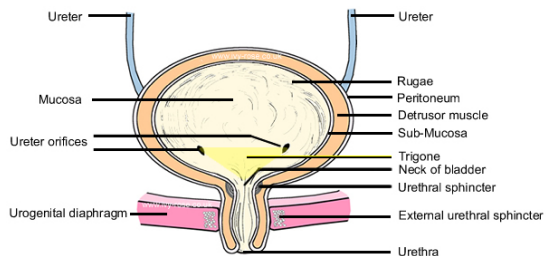
Overview

- Background
- Purpose
- Methods
- Results
- Conclusions



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Background



IvyRose Ltd. 2006, Online at www.Ivy-Rose.co.uk

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Background

- Bladder Ca incidence (2008 annual incidence ~ 60,000)
 - 4th most common cancer in men
 - 9th most common in women
- Modifiable risk factors for bladder cancer
 - Tobacco and chemical exposure
 - Lack of awareness in Minorities & lower SES (Breslow)

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Purpose

- Data from
 - Florida Cancer Data System (FCDS), Florida's Environmental Public Health Tracking System, & US Census
 - Identify populations at risk for bladder cancer
 - Using individual and area based data
- IRB approval
 - University of Miami
 - Florida Department of Health

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Methods



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Methods – Cancer Data

- FCDS identified bladder cancers
 - Dx from 1998 -2002
 - All stages
 - Early = In-situ & Local
 - Advanced = Regional & Distant
 - Aggregated bladder ca patient data by block group based on residence at Dx
 - Stratified by gender & age group

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Methods – Population Data

- 2000 US Census Population
 - Aggregated population data at block group level
 - Stratified by gender and age group
 - Area-based poverty measures

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Arsenic & Drinking Water Wells

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Methods – Arsenic Data

- Florida Department of Health Drinking Water Toxics Program
 - Non-regulatory program
 - Not systematic sampling
 - Groundwater sampling of private drinking supplies throughout Florida (GIS – lat/long)
 - Arsenic samples (n=5,707)
 - Collected between Dec 2000 -May 2008
 - > 5,000 privately owned wells
 - 551 samples \geq 0.010 ppm arsenic in the groundwater

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Spatial Analysis - SaTScan

- Developed by Dr. Martin Kulldorff (NCI) and Dr. Farzad Mostashari (NYC Dept of Health)
- Spatial scan statistic
 - Cluster detection test
 - Detect location of clusters
 - Evaluate statistical significance

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SaTScan Process

- Block group level
 - Age and race covariates
- Files used
 - Cases – FCDS data
 - Population – US Census data
 - Block group centroid - US Census

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SaTScan (con't)

- Poisson probability model
 - 9,999 Monte Carlo replications
- Expected n of cases
 - Indirect standardization (State)
- Adjusts for covariates & interaction terms (gender and age)
- Spatial analysis only
- Identified areas with higher than expected number of cases

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GIS

- ArcGis v 9.0
 - Plotted the 'areas of higher than expected' bladder ca cases (block group from SatScan)
 - Plotted contaminated wells (lat/long)
 - Computed distance buffers from contaminated wells to centroid of 'cluster' block groups
 - > 5 miles
 - 3-5 miles
 - < 3 miles

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Dataset/Analysis

- Enriched dataset contained
 - Bladder ca abstracted cancer information
 - Appended GIS data
 - Living within a 'cluster'
 - Distance to contaminated well
- Multivariate logistic regression
 - Dependent variable – living in a 'cluster'

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Results

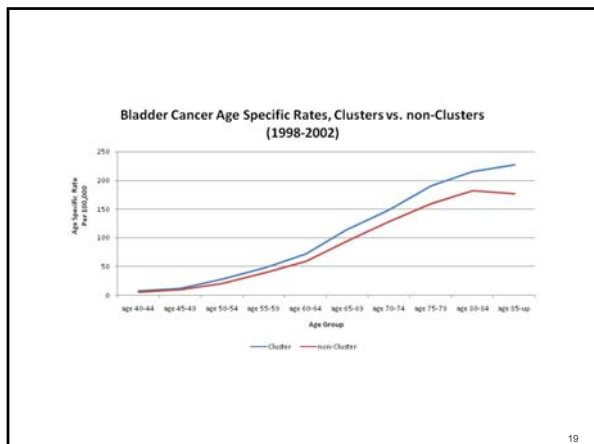


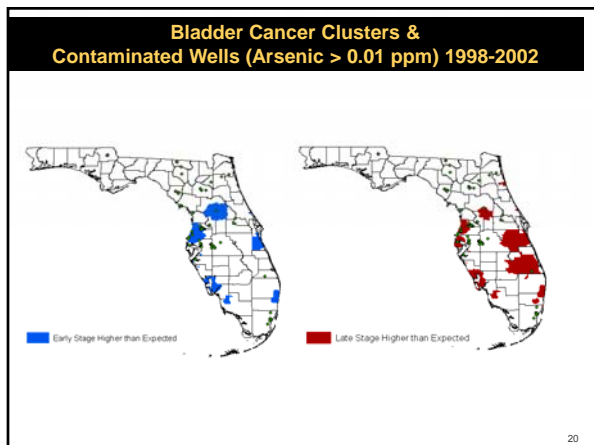
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Bladder Cancer Patients in Florida (1998-2002)

	All Bladder Ca N=23,266	Late Stage Bladder Ca N=4,344	Early Stage Bladder Ca N=18,922	p-value
Ethnic Distribution				
White	20,967 (90%)	3,737 (86%)	17,230 (91%)	< 0.001
Black & Hispanic	2,299 (10%)	607 (14%)	1,692 (9%)	
Gender				
Male	17,446 (75%)	3,173 (73%)	14,273 (75%)	< 0.001
Female	5,820 (25%)	1,171 (27%)	4,649 (25%)	
Location				
Rural	1,195 (5%)	282 (7%)	913 (5%)	< 0.001
Urban	22,071 (95%)	4,062 (93%)	18,009 (95%)	
Patients Living in Bladder Ca				
Cluster	6,740 (29%)	1,052 (24%)	5,688 (30%)	< 0.001
non-Clustered	16,526 (71%)	3,292 (76%)	13,234 (70%)	
Number of Bladder Ca Clusters	25	12	13	
FCDS Individual Tobacco Use				
Non Tobacco User	6,469	1,165	5,304	0.061
Current Smoker	4,101	829	3,272	
Former Smoker	7,351	1,273	6,078	
Tab Other/Ukn	5,345	1,076	4,269	

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Logistic regression of living in areas of greater than expected early and late stage Bladder Cancer

	LATE Stage OR (95% CI) N= 4,344	EARLY Stage OR (95% CI) N= 38,922
Area-based SES		
Poverty	1 -	1 -
Non Poverty	2.8 (1.6, 4.9)	3.4 (2.5, 4.7)
Well Water Arsenic exposure		
>5 miles	1 -	1 -
<5 and >3 miles	1.4 (1.1, 1.8)	0.5 (0.4, 0.5)
<3 miles	2.0 (1.7, 2.5)	1.1 (0.9, 1.2)
FCDS Race/Ethnicity		
Black	1 -	1 -
White	1.8 (1.2, 2.6)	2.0 (1.5, 2.6)
FCDS Urban and Rural		
Rural	1 -	1 -
Urban	2.8 (2.2, 3.7)	15.6 (10.6, 22.7)
FCDS Tobacco Usage		
Non tobacco user	1 -	1 -
Current Smoker	0.7 (0.6, 0.9)	0.9 (0.8, 0.96)
Former Smoker	0.8 (0.6, 0.9)	1.2 (1.1, 1.3)
Other/Unknown	1.1, (0.9, 1.3)	1.0 (0.9, 1.1)

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Limitations

- Ecologic study focused on Clusters
- Patient residence at DX
- Arsenic detection in private wells only
 - Not systematic testing program
- Analysis at different levels of geography
 - Future analysis - hierarchal analysis
- Self reported smoking status

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Conclusions

- Bladder ca mortality has not decreased in a clinically significant way over the past 25 years
- Spatial analysis
 - Identified areas where targeted bladder ca public awareness campaigns for high risk populations
 - Bladder ca screening & prevention programs
 - Controversial
 - Cost effective to be viable

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Conclusions

- Environmental analysis
 - Arsenic contamination
 - Arsenic Wells
 - Ground contamination
 - Previous land use as orchards and farm land
- Overall model
 - Urban, High SES, White

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Thank you

Additional information

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