

Arrow Project

Ori Liran, MD

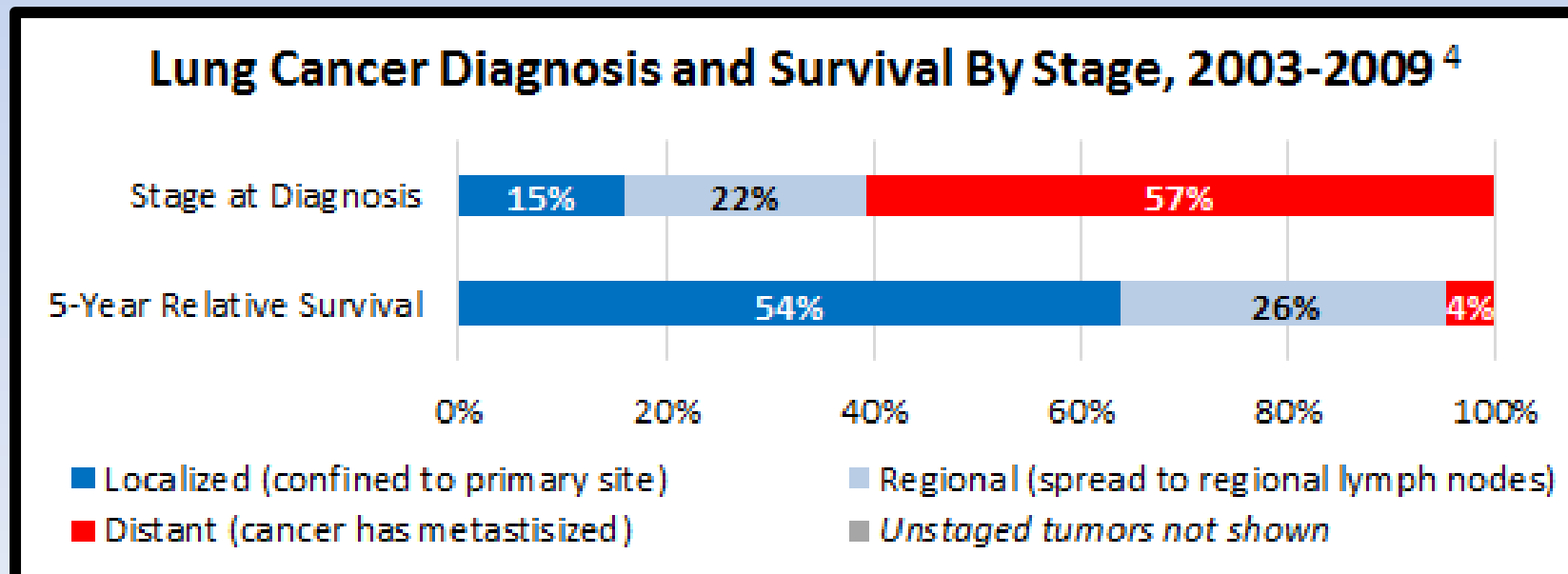
Game Plan

- Arrow Project research
- Current research
- Optimizing your arrow project experience



Arrow Project research - Introduction

- Lung cancer – prevalent and deadly
- Most patients – late diagnosis

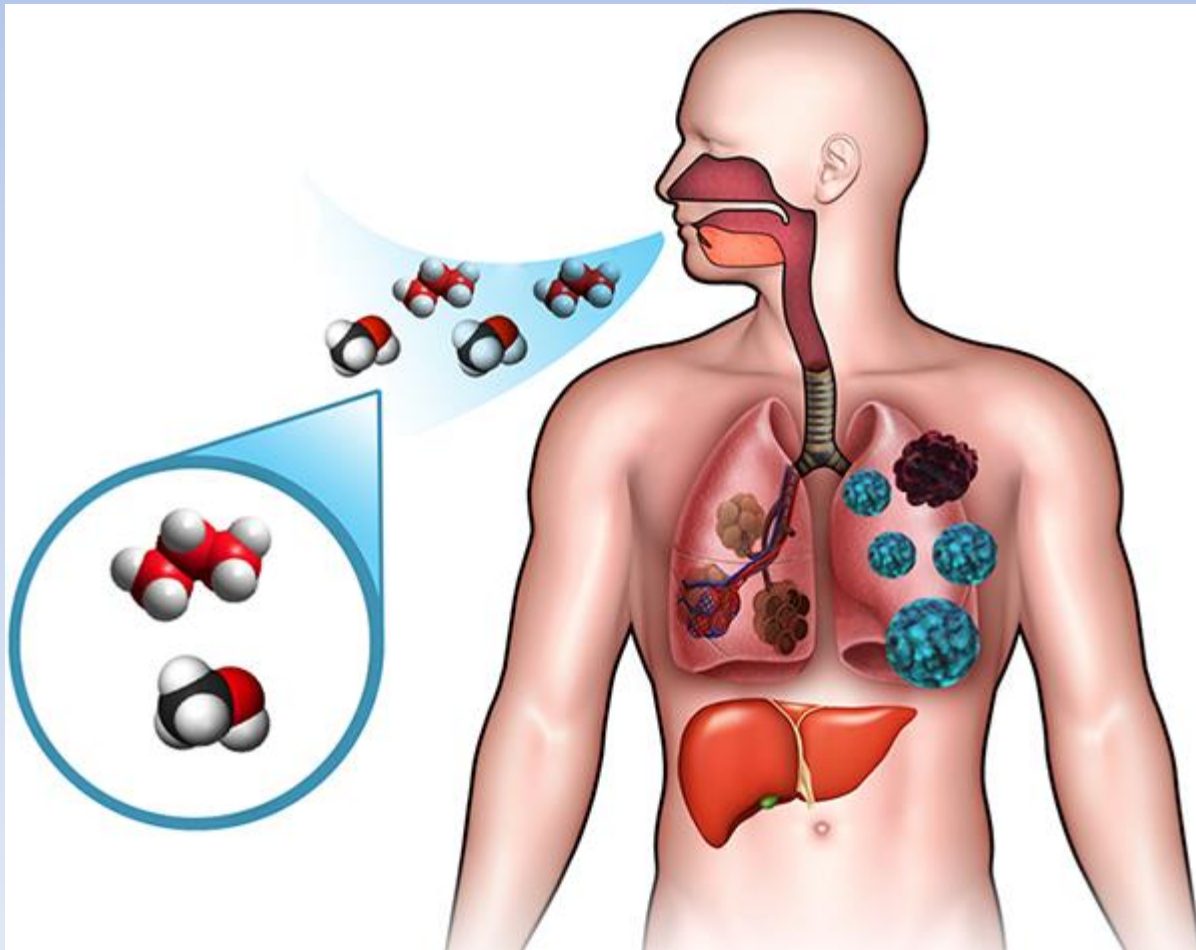


Arrow Project research - Introduction

- Lung cancer – prevalent and deadly
- Most patients – late diagnosis
- No effective screening method

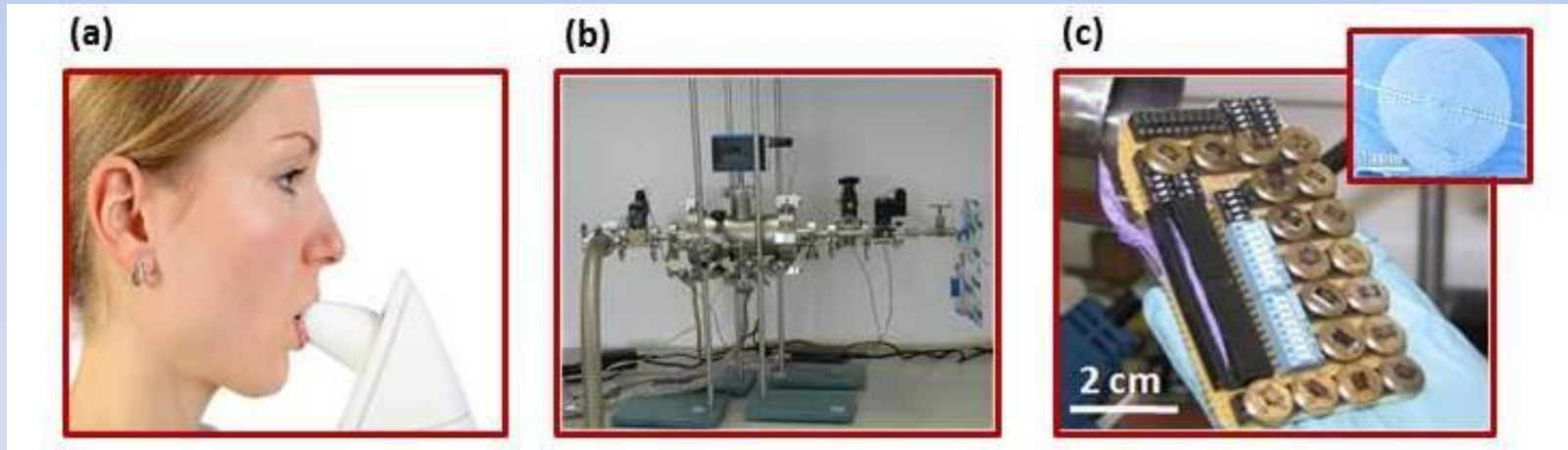
Arrow Project research - Methods

- **Volatile Organic Compounds (VOCs)**



Arrow Project research - Methods

- Detection – Nanoscale Artificial NOSE (TMNA NOSE)

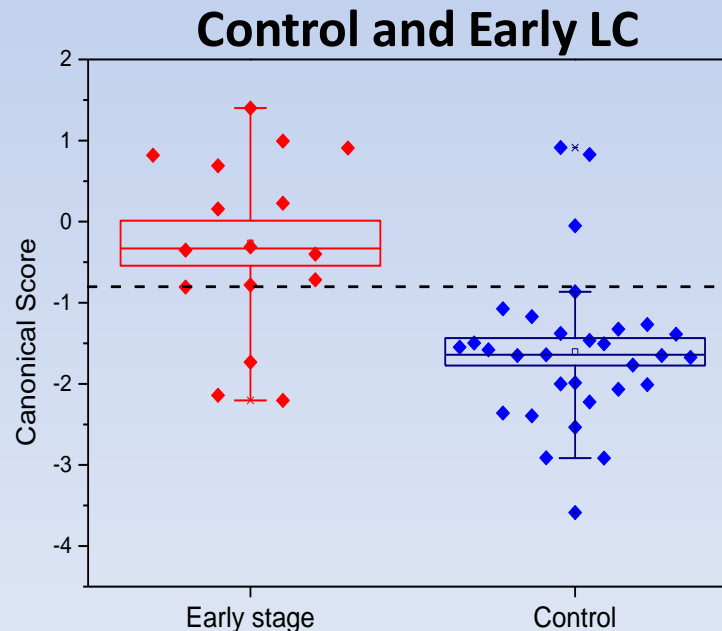


Arrow Project research - Results

Israel's Patiens	Advanced disease (N=64)	Early disease (N = 16)	Control (N=31)
Age (years)	63.1±11.2	61.2±8.6	63.2±11.12
Active Smokers	16 (25%)	2 (12.5%)	6 (19.4%)
PY (total)	55.06±40.3	46.8±24.2	52.5±32.2
Histology	NSCLC: 54 Adeno. 49 Squamous 5 SCLC: 6	NSCLC: 14 Adeno. 13 Squamous 1 SCLC: 2	Nodule: 17 COPD: 10 Healthy: 4

Arrow Project research - Results

	Sensitivity	Specificity	Accuracy
Control / Early LC	81.25%	90.32%	85.11%
Control / Advanced LC	81.25%	87.10%	82.11%
Early LC /Advanced LC	80.26%	75%	78.75%

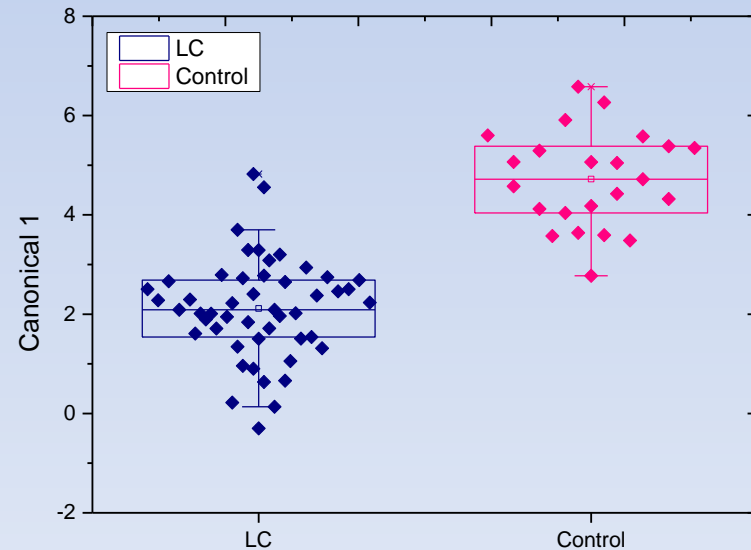
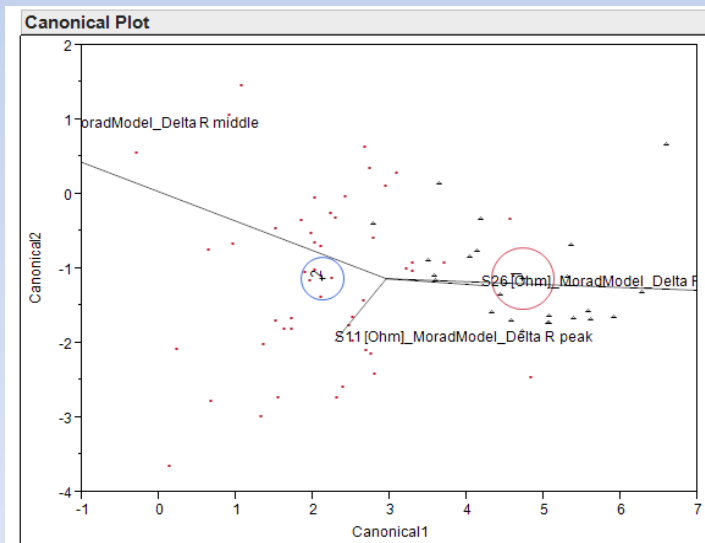


Arrow Project research - Results

Florida's Patients	Advanced disease (N=36)	Early disease (N = 12)	Control (N=23)
Age (years)	65.86±9.6	71.3±10.2	65.04±15.2
Active Smokers	10 (27.7%)	3 (25%)	12 (52%)
PY (total)	59.8±27.03	55±25.65	NA
Histology	NSCLC: 29 Adeno. 21 Squamous 8 SCLC: 7	NSCLC: 11 Adeno. 6 Squamous 5 SCLC: 1	COPD: 12 Abnormal CXR: 3 Asthma/SOB: 5 Sarcoidosis: 1 Cough 2

Arrow Project research - Results

	Sensitivity	Specificity	Accuracy
Control / LC	93.87%	95.65 %%	94.44%
Early LC /Advanced LC	83.33%	91.66 %	89.58%



Arrow Project research - Conclusion

- Breath analysis discriminated lung cancer from matched controls
- Breath analysis discriminated early stage patients from advanced disease patients

Group Members



Prof Nir Peled, PI



**Maya Ilouze, PhD
Post-Doc**



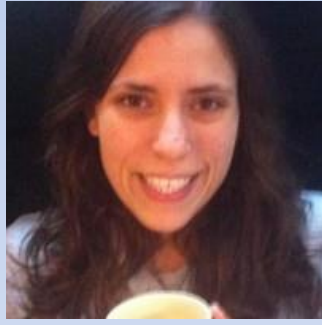
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Collaborations



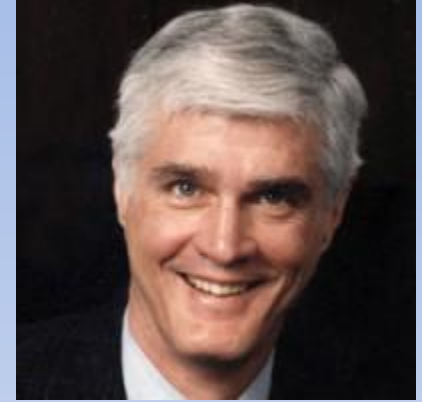
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**KEEP
CALM
AND
BREATHE**

Current research



Drug Wastage



Background

- Drug companies provide oversized single dose vials
- The leftover drug is going to waste and produce immense profit to the drug companies



Background

- Drug companies will earn around \$1.8bn from leftover cancer drugs in the United States in 2016*

*Bach et al. *Bmj* 2016

Background

- Bortezomib (Velcade) is available in only 3.5mg vial size, which is higher than the average dose prescribed*
- A simple adjustment in vial size may reduce the waste of bortezomib by 36-62%*

*Clark et al. *Value in Health* 2011

Background

- Using strict internal protocols for waste minimization, may reduce drug wastage by 45%*

*Fasola et al. *BMC Health Services Research*

Objectives

- Estimating the scope of drug wastage in Belinson and israel
- Estimating vial sharing strategies as a possible temporary solution

Methods

- Systematic examination of all intravenous anti-cancer drugs used in Belinson's Cancer center in March 2016
- Data for drug usage and wastage was retrieved

Methods

- Israeli drug prices were calculated according to the MOH official price list - june 2016, and the prices on private pharmacies
- American drug prices were calculated according to the ASP Drug Pricing Files - October 2016

Results

Results

- 84 anti cancer drugs were used
- 76 drugs' prices were available

Results

- Total money spent on drugs in March was **10,640,420.42 NIS**
- Total money spent on wasted drugs in March was **544,419.57 NIS (5.11%)**
- Yearly wasted money estimation is **6,533,034.86 NIS**

Results – Top 20 money wasting

Bortezomib 3.5 mg	48629.09621
Trastuzumab 440mg	24871.37236
Pemetrexed 500mg	20434.5645
Paclitaxel - Teva 300mg	14210.2974
Azacitidine 100mg	8290.26
Melphalan 50mg	8047.9918
Carfilzomib 60mg	7401.71264
Bendamustine 100mg	7023.64
Rituximab 500mg	6026.192
Romidepsin 10mg	5522.166
Panitumumab 100mg	4963.153
Bevacizumab 400mg	4786.922
Cabazitaxel 60mg	3867.31638
Bendamustine 25mg	3511.82
Trastuzumab emtansine 100mg	3505.8
Docetaxel Hospira 80mg	3250.941242
Busulfan 60mg	3066.8947
Busulfan 60mg	3066.69024
Trabectedin 1mg	2266.704
Nivolumab 40mg	2137.248

Results – Wastage

- 26 drugs (30.95%) have zero wastage

Comparison to Bach's paper

Drug name	2016 expected revenue from leftover drug (\$m) (Bach)	Belinson's leftover drug revenue per year	Israel's leftover drug revenue per year	Extrapolation for US population	
Pemetrexed (Alimta)	54.64	0.245	0.98	36.78	
Cetuximab (Erbix)	29.18	0	0	0	
Bortezomib (Velcade)	308.74	0.583	2.33	87.53	
Carfilzomib (Kyprolis)	231.45	0.088	0.355	13.32	

Collaboration



Daniel Goldstein MD

Arrow project experience

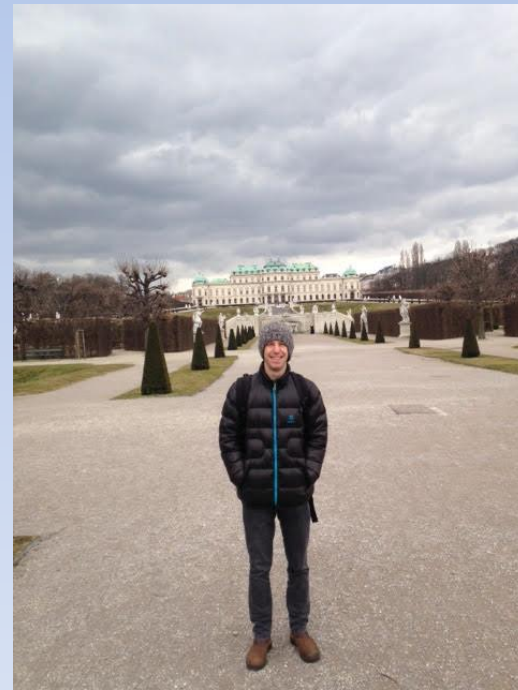
Arrow project – Pulmonologists annual meeting – June 2014



Arrow project – Technion's Enose workshop – February 2015



Arrow project – European radiologists congress, Vienna – March 2015



Arrow project – Optimization

- **Opportunity**

- Personal

- Understand research
 - Contribute to science

- Professional

- Networking
 - Diversity
 - Academic promotion
 - Future residency

Arrow project – Optimization

- Opportunity (personal and professional)
- Hunger, Drive, Curiosity
- Perfectionism vs. Optimatism

Arrow project – Optimization

- People and places...

Arrow project



- Congratulations!
Today is your day.
You're off to Great Places!
You're off and away!

You have brains in your head.
You have feet in your shoes.
You can steer yourself
any direction you choose.
You're on your own. And you know what you
know.
And YOU are the guy who'll decide where to
go.

- And will you succeed?
Yes! You will, indeed!
(98 and 3/4 percent guaranteed.)

KID, YOU'LL MOVE MOUNTAINS!

So...

be your name Buxbaum or Bixby or Bray
or Mordecai Ali Van Allen O'Shea,

You're off the Great Places!

Today is your day!

Your mountain is waiting.

So...get on your way!

Thank you for your attention !

This is
my
thank you
dance!

