

# Robotics and patient engagement innovations at Children's Hospital in San Francisco

Seth Bokser, MD

June 1, 2016



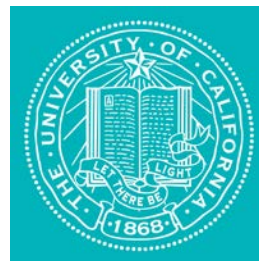


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# Disclosure: Industry Advisor Relationships

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- Google Health Editorial Board
- Oneview Health Care Advisory Board
- Kyruus Clinical Advisory Board
- Konica Minolta Clinical Advisory Board
- Qidza Advisory Board

# *Doctor*



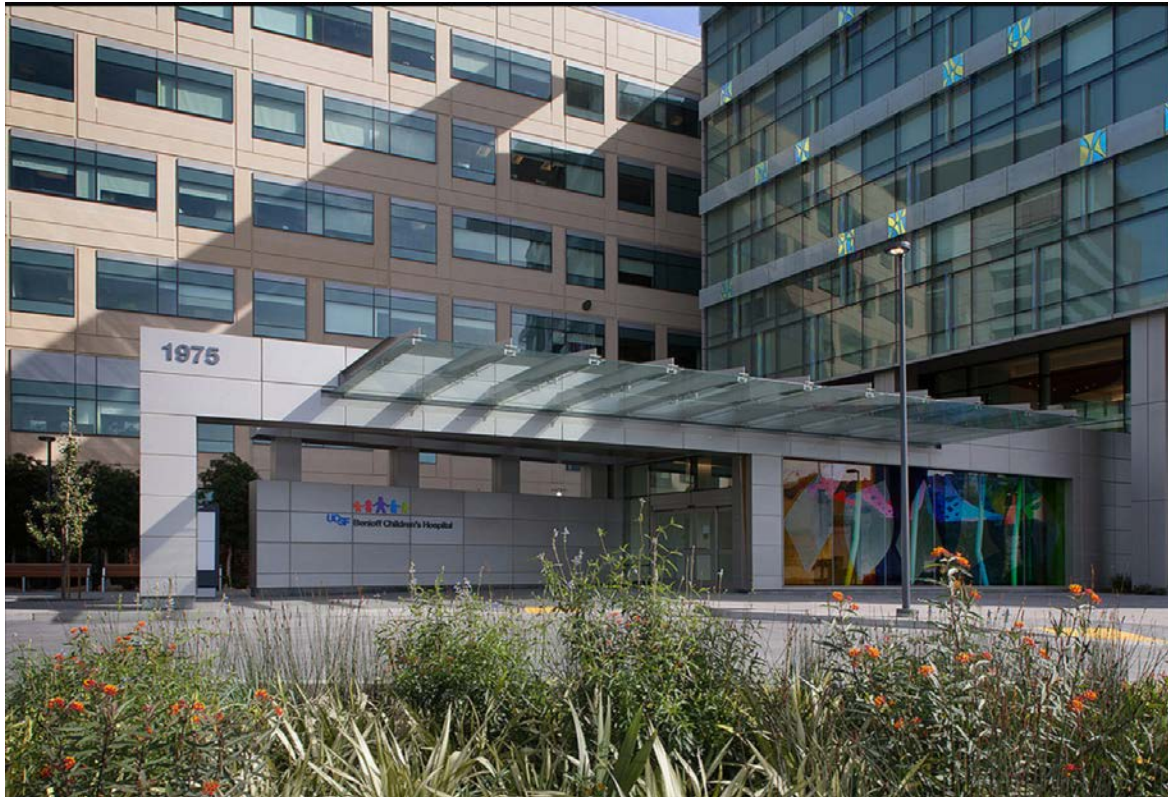
# *Informaticist*

A doctor that applies information technology to the art, science, and operations of healthcare.

# Building a Hospital for the Future



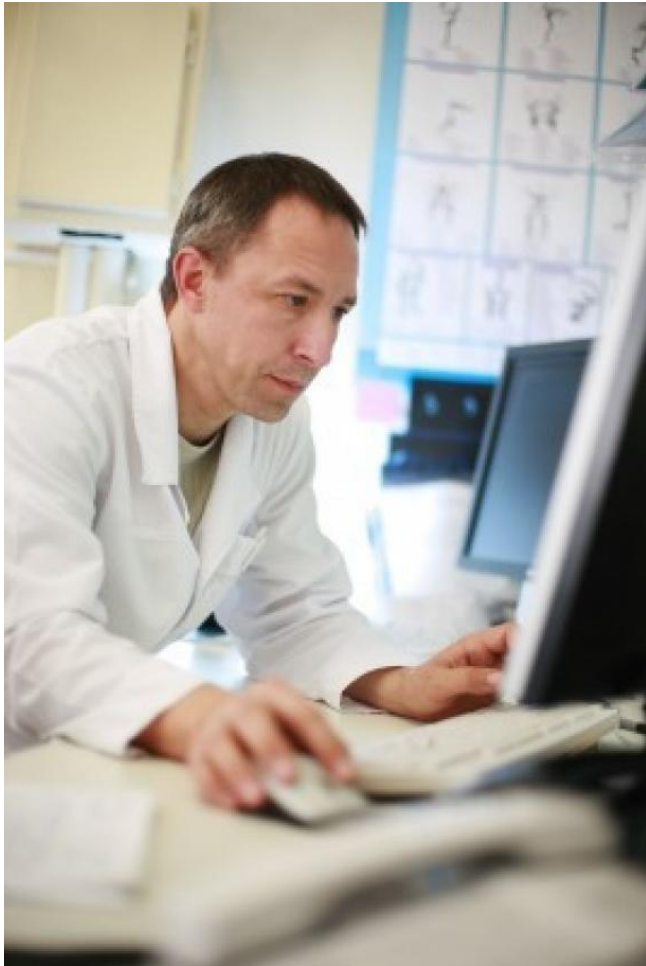
# Building a Hospital for the Future for Our Bay Area Community and the World



# Hello Neighbors



# Automation = Safety and Efficiency





# Automation = Safety and Efficiency



**Swisslog Healthcare Solutions**



**Intelligent Hospital System's RIVA**

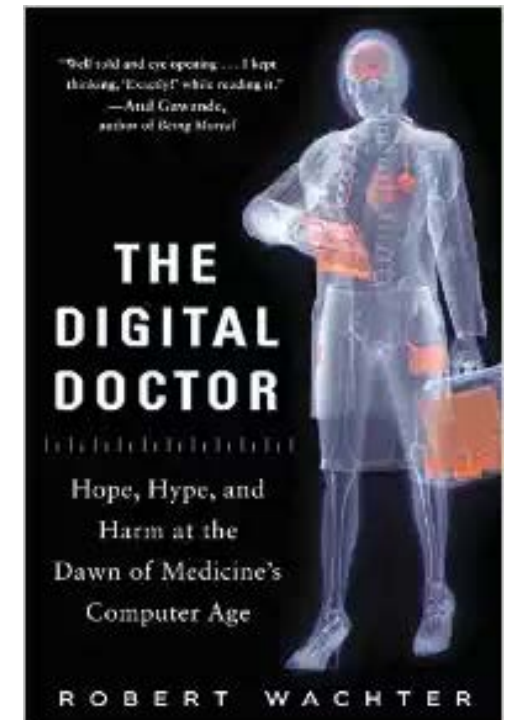
# Automation = Safety and Efficiency



# Automation = Safety and Efficiency



Error Rate from 2.8% to close to 0%



# Atheon Robotic Couriers at UCSF

- 27 robotic couriers
- 392 runs/day
- 454 deliveries/day
- 93 miles/day
- 230 hours/day
- 1300 hours per week
- The TUGs speak approximately 70 phrases





Nurses spend approximately 7% of their shift searching for equipment and supplies\*

- Do the equivalent work of 32.8 people
- Saves the organization a total of 46 FTEs



Hendrich A, Chow MP, Skierczynski BA, Lu Z. A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time? *The Permanente Journal*. 2008;12(3):25-34.

## World's largest fleet of automated robots to deploy at UCSF Mission Bay Medical Center

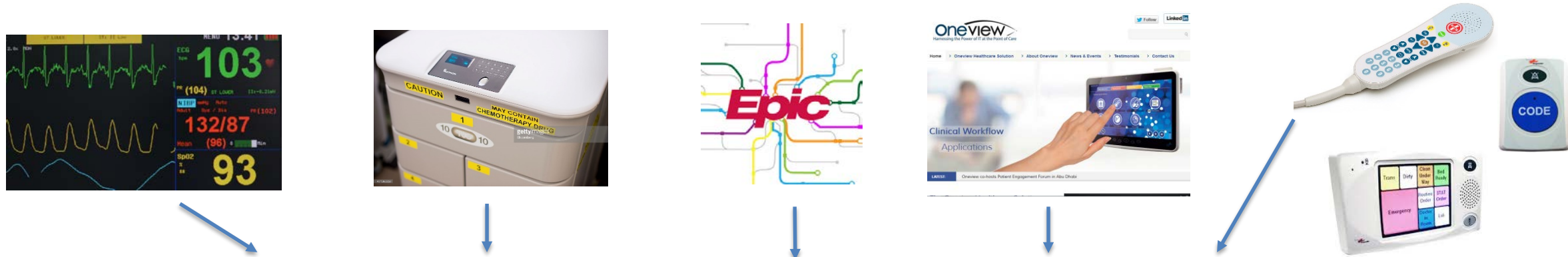
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CNET > Sci-Tech > Robots roam hallways of SF's newest hospital, lending a helping hand

### Robots roam hallways of SF's newest hospital, lending a helping hand



# Unified Communications

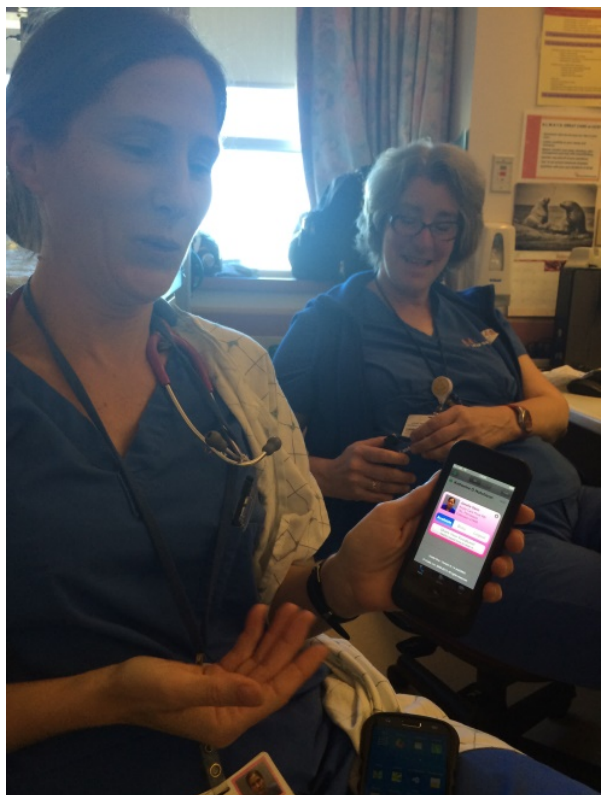


Integration Middleware Rules and Routing

**Connexall**<sup>®</sup>



# Voalte Smartphone Unified Communication



As of 5/1/2016

Texts=292,722

Phone Calls=141,562

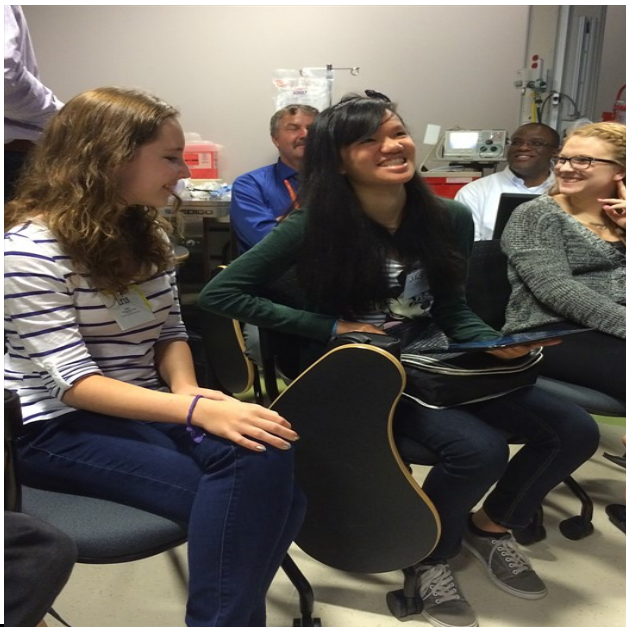
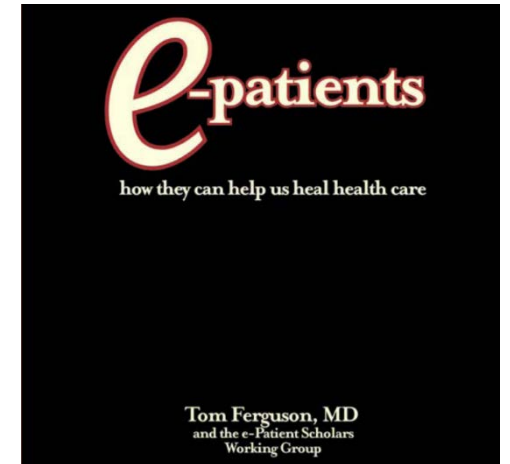
Alerts: 169,052





# Health 2.0 = Patient Facing

## E-patients = enabled, empowered & engaged



# “Liquid Consumer Expectations”



# Activated Patients Do Better, Cost Less, and Are More Satisfied

- Positive care experiences: Higher-quality interpersonal exchanges with physicians, greater fairness (*Alexander et al. Health Serv Res 2012*)
- Chronically ill patients more likely to adhere to treatment; perform regular self-monitoring at home; and obtain regular chronic care, such as foot exams for diabetes (*Hibbard et al. Health Serv Res 2007*)
- Better biometrics such as BMI, hemoglobin A1c, blood pressure, and cholesterol in the normal range (Terry et al. *Am Jnl Hlth Prom 2011*)
- Half as likely to re-visit ED or re-admitted (Mitchell et al. *JGIM 2014*)

# *“The Blockbuster Drug of the Century: An Engaged Patient”*

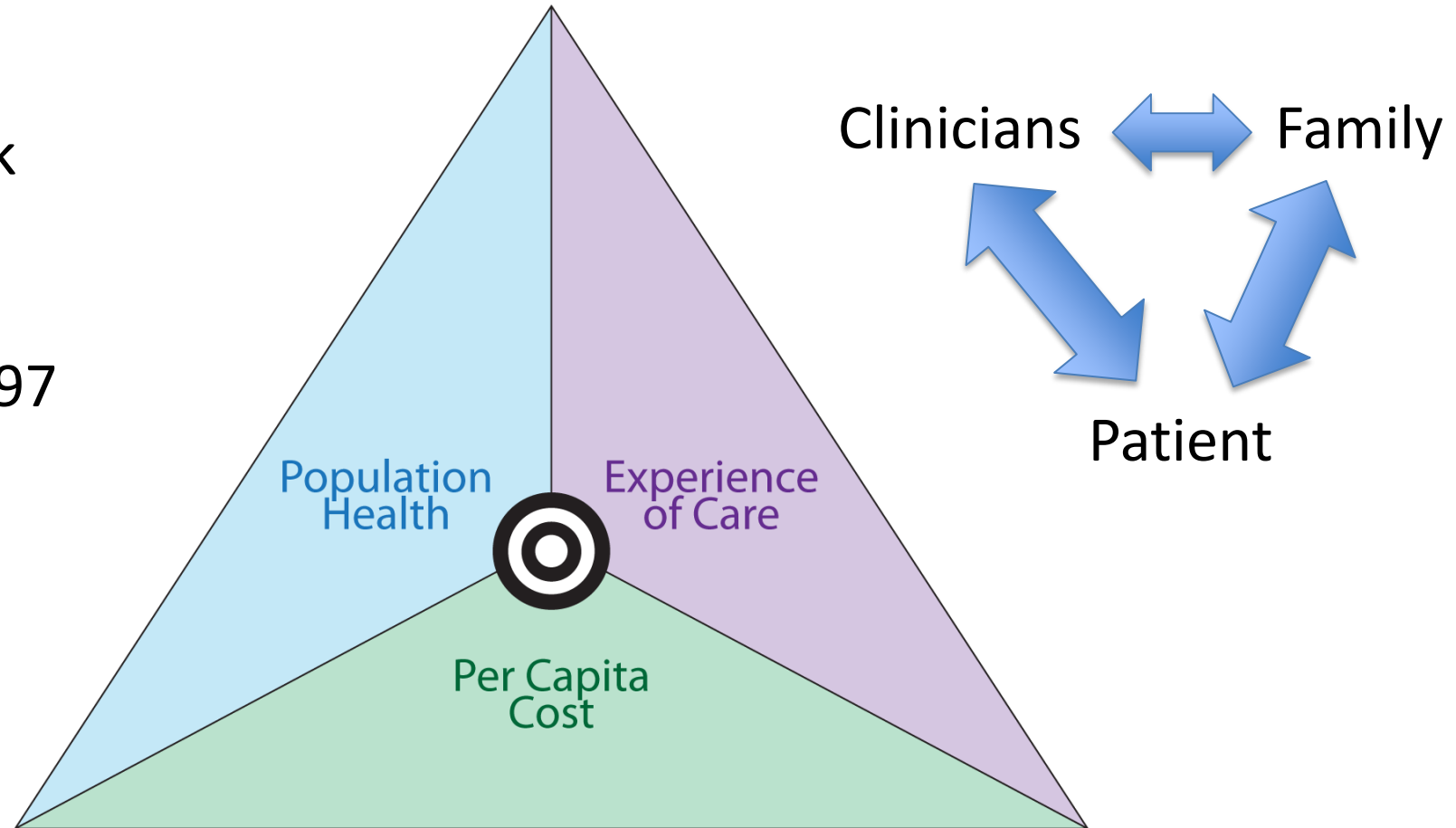
- Leonard Kish Aug 28, 2012

- Cuts across racial, ethnic, & socioeconomic demographics (Hibbard et al Health Affairs 2013)
- Activation can be modified and increased over time w/ intervention (Deen D. Pt Ed Couns 2011)

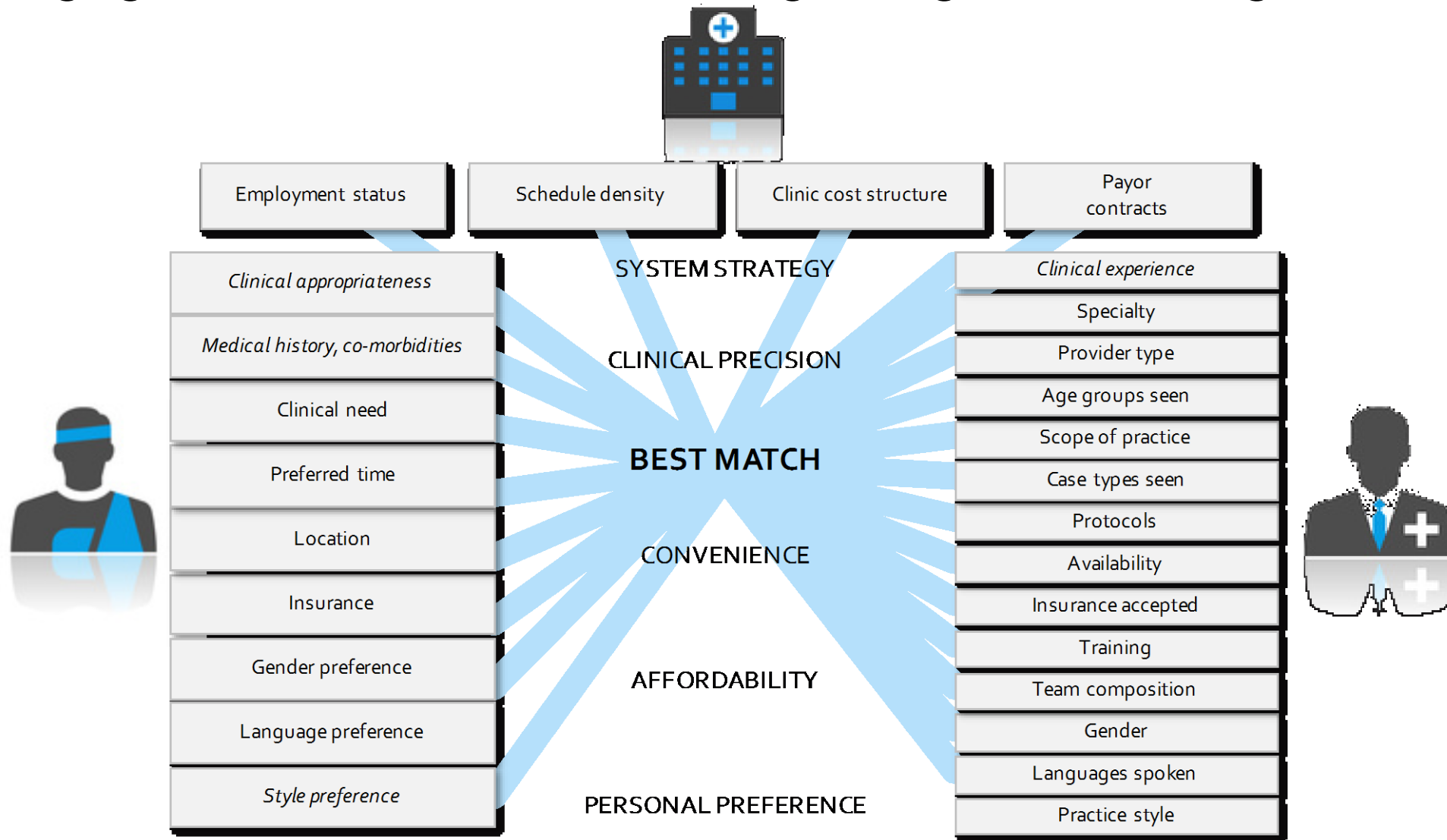
# Patient Engagement is a Key to Triple Aim

“You’ve got to start with the customer experience and work backward.”

-Steve Jobs 1997



# Engagement Starts from the Beginning with the Right Match



# Quality

The Washington Post

Health & Science

## Do you need complex surgery? Some doctors may not have much practice.

Laryngoscope, 2011 Apr;121(4):746-52. doi: 10.1002/lary.21456.

**Impact of surgeon and hospital volume on short-term outcomes and cost of oropharyngeal cancer surgical care.**

Gourin CG, Forastiere AA, Sanguineti G, Marur S, Koch WM, Bristow RE.

Author information

**Abstract**

**OBJECTIVE:** To evaluate the impact of surgeon and hospital case volume and other related variables on short-term outcomes after surgery for oropharyngeal cancer.

**METHODS:** The Maryland Health Service Cost Review Commission database was queried for oropharyngeal cancer surgical case volumes from 1990 to 2009. Multivariable regression models were used to identify significant associations between surgeon and hospital case volume, as well as independent variables predictive of in-hospital death, postoperative wound complications, length of hospitalization, and hospital-related cost of care.

**RESULTS:** Overall, 1,534 oropharyngeal cancer surgeries were performed during the study period. Complete financial data was available for 1,482 oropharyngeal cancer surgeries, performed by 233 surgeons at 36 hospitals. The only independently significant factors associated with the risk of in-hospital death were an APR-DRG mortality risk score of 4 (odds ratio [OR] = 14.0,  $P < .001$ ) and total glossectomy (OR = 5.6,  $P = .020$ ). Wound fistula or dehiscence was associated with an increased mortality risk score (OR = 5.9,  $P < .001$ ), total glossectomy (OR = 6.9,  $P < .001$ ), mandibulectomy (OR = 3.4,  $P < .001$ ), and flap reconstruction (OR = 2.1,  $P = .038$ ). Increased mortality risk score, total glossectomy, pharyngectomy, mandibulectomy, flap reconstruction, neck dissection, and Black race were associated with an increased length of stay and hospital-related costs. After controlling for all other variables, a statistically significant negative correlation was observed between surgery at a high-volume hospital and length of hospitalization and hospital-related costs.

**CONCLUSIONS:** After controlling for other factors, high-volume hospital care is associated with a shorter length of hospitalization and lower hospital-related cost of care for oropharyngeal cancer surgery.

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PMID: 21433017 [PubMed - indexed for MEDLINE] PMCID: PMC3612951 [Free PMC Article](#)

Pediatrics

American Academy of Pediatrics

## Association of Center Volume With Mortality and Complications in Pediatric Heart Surgery

Sara K. Pasquali, MD, MHS, Jennifer S. Li, MD, MHS, [...], and Jeffrey P. Jacobs, MD

[Additional article information](#)

**Abstract**

**OBJECTIVE:**

Previous analyses have suggested center volume is associated with outcome in children undergoing heart surgery. However, data are limited regarding potential mediating factors, including the relationship of center volume with postoperative complications and mortality in those who suffer a complication. We examined this association in a large multicenter cohort.

**METHODS:**

Children 0 to 18 years undergoing heart surgery at centers participating in the Society of Thoracic Surgeons Congenital Heart Surgery Database (2006–2009) were included. In multivariable analysis, we evaluated outcomes associated with annual center volume, adjusting for patient factors and surgical risk category.

# Experience



Search across all providers  
 Filter by customer preferences  
 Accommodate complex business rules  
 → Optimize conversion & capacity



**Departures**

Flight #	Destination	Time	Class	Remarks
888181	ROME	07130	C1	EXPIRED
ACC881	TORONTO	07130	C1	EXPIRED
598829	LONDON	08110	C1	SCHEDULE
422289	LOS ANGELES	08110	C1	SCHEDULE
893309	PHILADELPHIA	08120	CAS	OH TIR
413202	MILWAUKEE	08120	CAS	OH TIR
593209	MILWAUKEE	08120	SPT	OH TIR
188214	CANCUN	08190	A1B	OH TIR
463274	NEW YORK	08190	CAS	OH TIR
448287	COPENHAGEN	08190	CAS	OH TIR
613332	PHILADELPHIA	08190	A1B	OH TIR
463289	PENNSA	08190	A1B	OH TIR
413289	CHICAGO	10110	SAS	OH TIR
613411	CHICAGO	10120	CPT	OH TIR
548474	MCCOM	10120	CPT	OH TIR

**Airline Key**

- American
- Delta
- United
- Frontier



**Map Locations:** Kani Hills, Huntersville, Concord, Albemarle, Stowe, Charlotte.

Systemic-related etiology - What type of smell is the malodor?	Test: caries and/or periodontal disease
<b>Ammoniac</b> Refer to MD for liver evaluation	<b>Better: eggs/coliform</b> Refer to ENT for evaluation
<b>Vinyl</b> Refer to MD for GI evaluation	<b>Foul</b> Refer to MD for respiratory evaluation/ smoking cessation
<b> Metallic</b> Refer to MD for audiology evaluation	

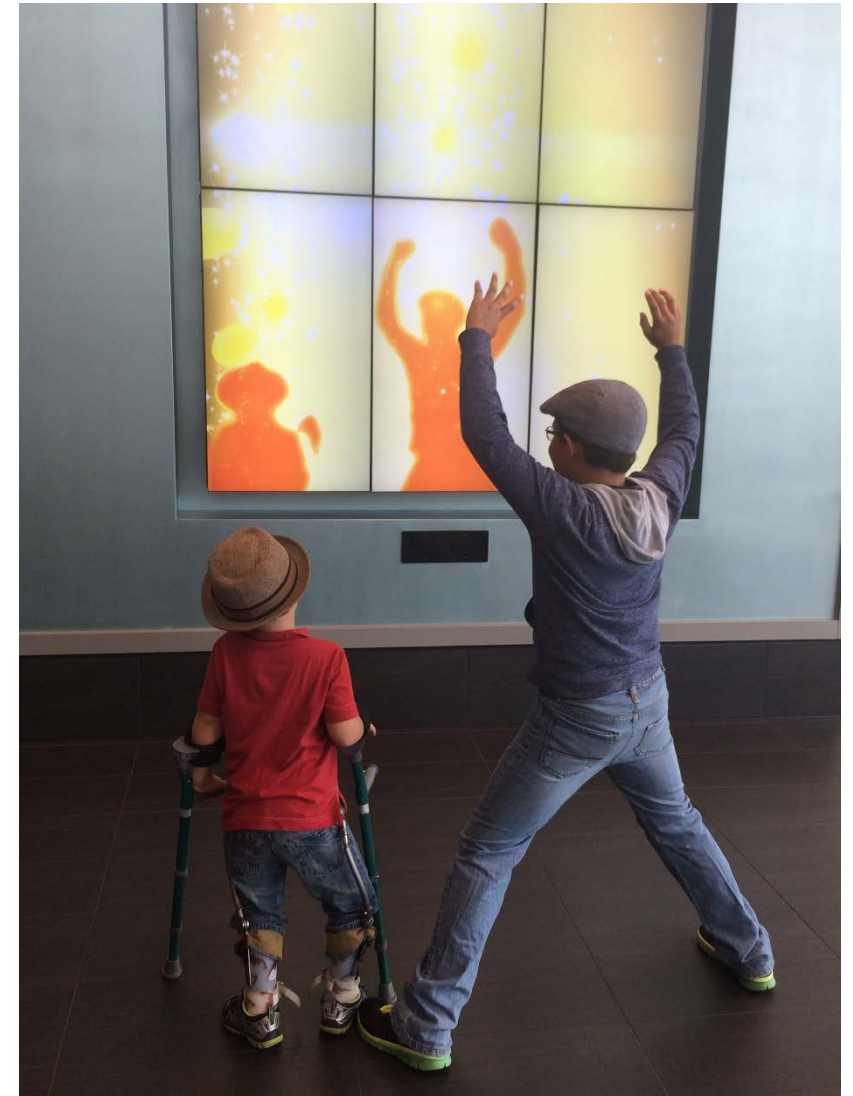




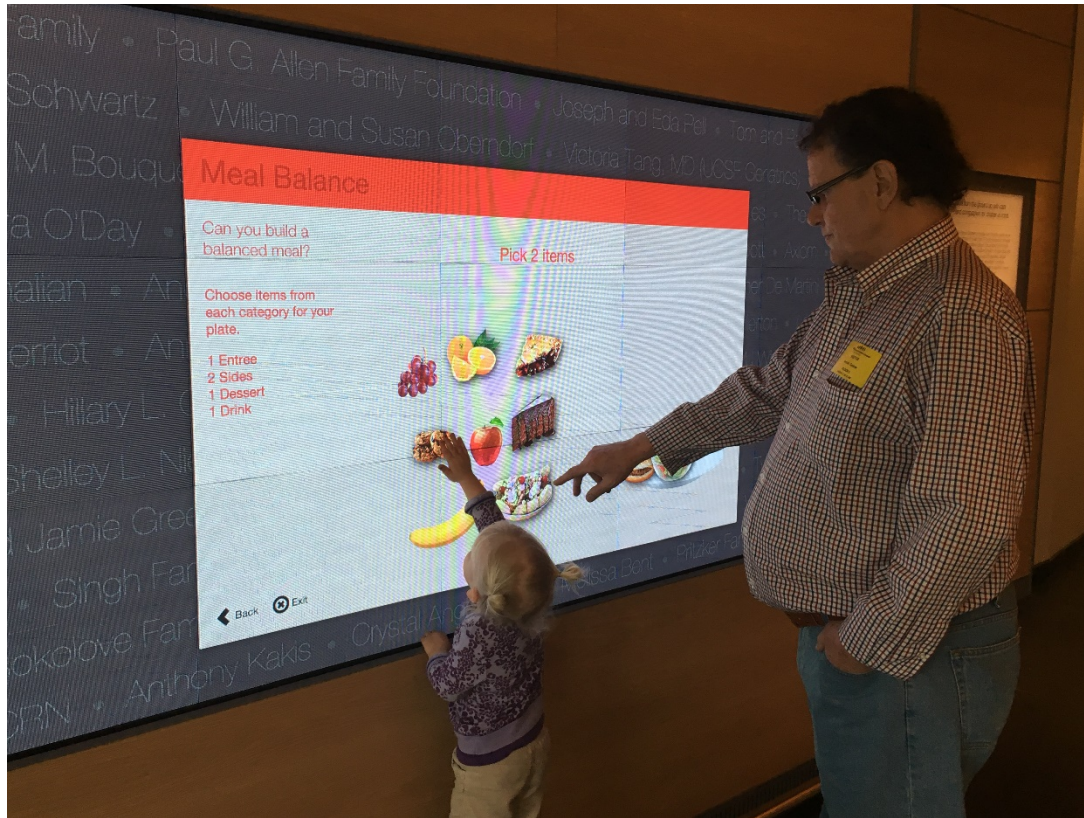
# Kyruus Algorithmic Matching: Balancing Supply and Demand Giving Patients Choice



# Welcome Lobby = Ouva



# Interactive Teaching Walls



# Oneview Interactive Patient Care

## Welcome to “Your Room”



# Personalization: Age and Language

UCSF Medical Center  
at Mission Bay

Добро пожаловать в  
Oneview Здоровье Решение

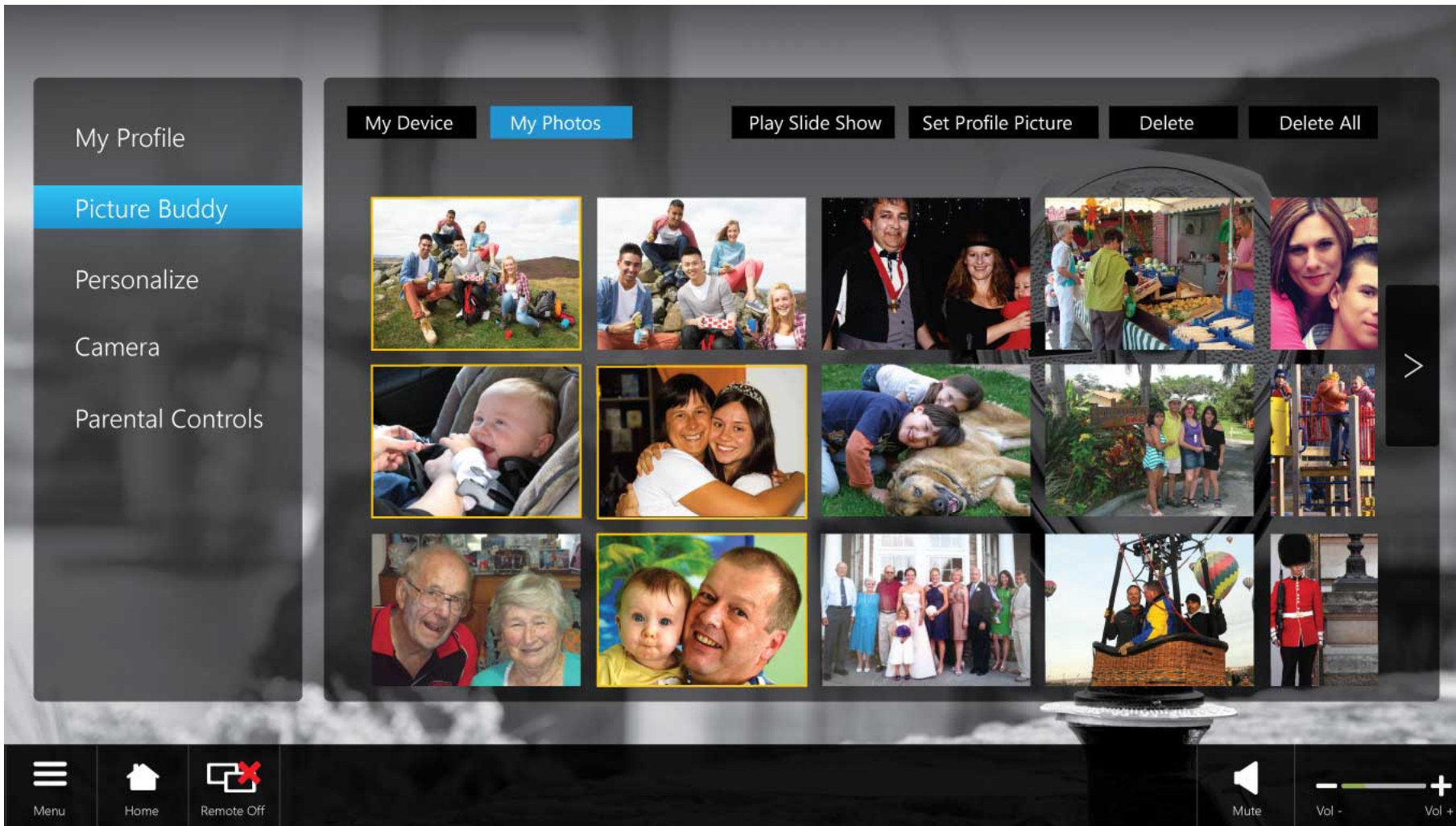
Введите свою дату рождения,  
чтобы получить доступ к системе

MM / DD / YYYY

Введите

Oneview

# Humanization: Connection to Support System



Instagram

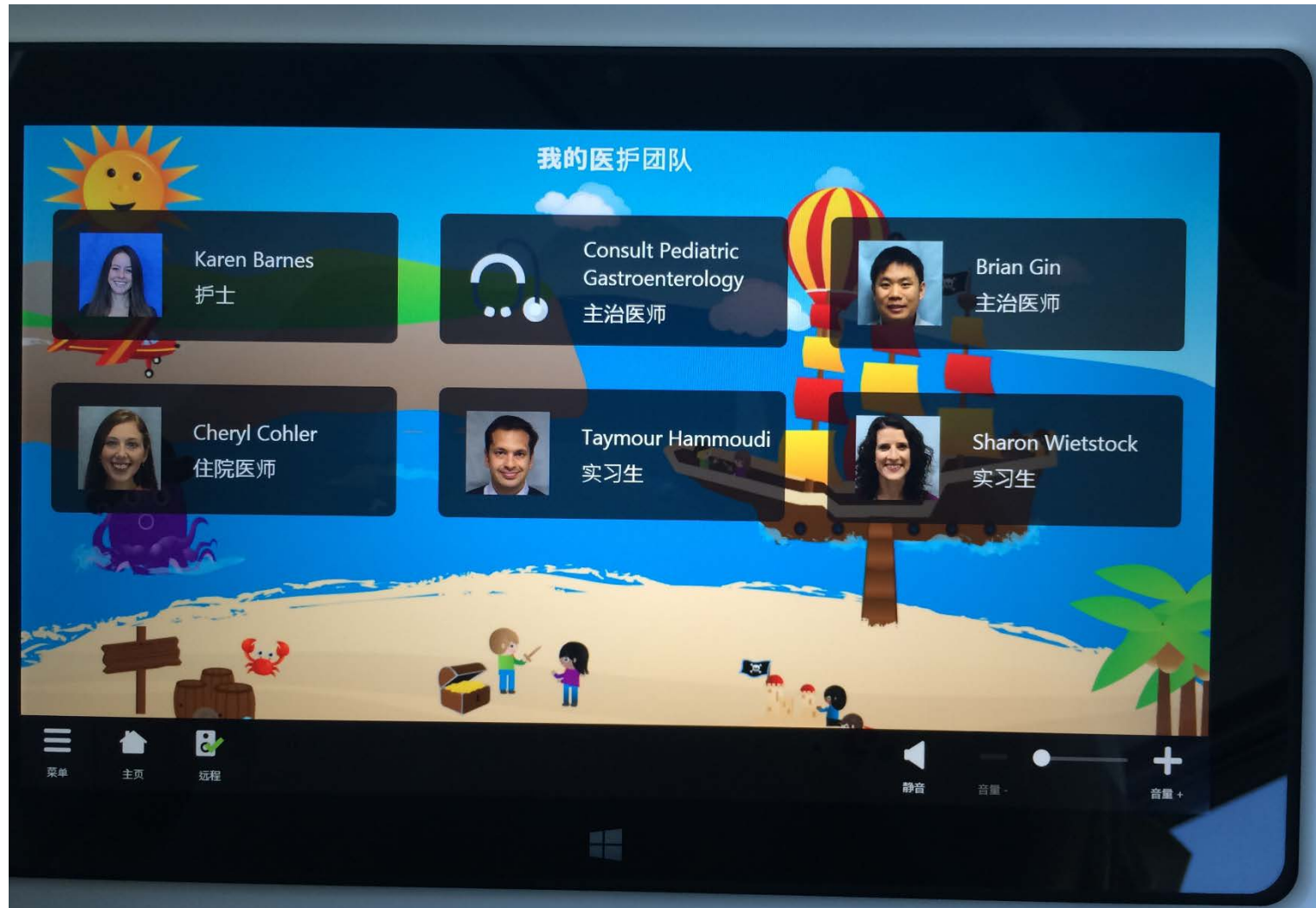
YouTube



# Oneview Entertainment and Gaming



# Using IT to Connect to Your Treatment Team





# The effect of tablet computers with a mobile patient portal application on hospitalized patients' knowledge and activation




Kevin J O'Leary, Mary E Lohman, Eckford Culver, Audrey Killarney, G Randy Smith Jr, David M Liebovitz

DOI: <http://dx.doi.org/10.1093/jamia/ocv058> ocv058 First published online: 15 June 2015




	Intervention (n =100)	Control (n=102)	P Value
Recognize $\geq$ 1 Provider Name	56%	29%	<.001
Recognize $\geq$ 1 Provider Role	47%	16%	<.001
Patient Activation Measure	64.1	62.7	0.46



Breakfast



Lunch



Dinner



Guest Menu (\$)


Back


# Lunch

Regular Diet

More details


 Soups & Sides


 Entrees


 Paesano's Italian


 Burgers & Melts

 Smart Choice Salads

 Build a Sandwich

 Snacks

 Beverages

 Condiments

 Sunrise Breakfast Cafe

Mushroom Barley Soup SS Vg

Vegetable Primavera Soup SS Vg

Chicken Noodle Soup SS

Beef Broth GF SS

Chicken Broth GF SS

Vegetable Broth GF SS Vg

Mashed Potatoes with Gravy V

White Rice GF SS Vg

Organic Brown Rice GF L/s SS Vg

Organic Wheat Roll L/s SS V

Steamed Green Bean Blend GF SS Vg

Roasted Italian Squash GF SS Vg

Seasoned Baby Carrots GF SS Vg

Steamed Broccoli GF SS Vg

Mixed Green Side Salad with Viniagrette GF V

Chicken Broth Juk with Green Onions GF SS

Pinto Beans GF L/s SS Vg

Snack Fruit Box with String Cheese GF SS V

Vegetable Snack Box with Ranch V

## Roasted Italian Squash

Energy (kcal)	43 kcal
Fat	2 gm
Cholesterol	0 mg
Total Carbohydrates	6 gm
Protein	2 gm
Sodium	16 mg
Potassium	282 mg

GF Gluten Free

SS Smart Choice Side

Vg Vegan

Order Now



Menu



Home



Remote



Mute

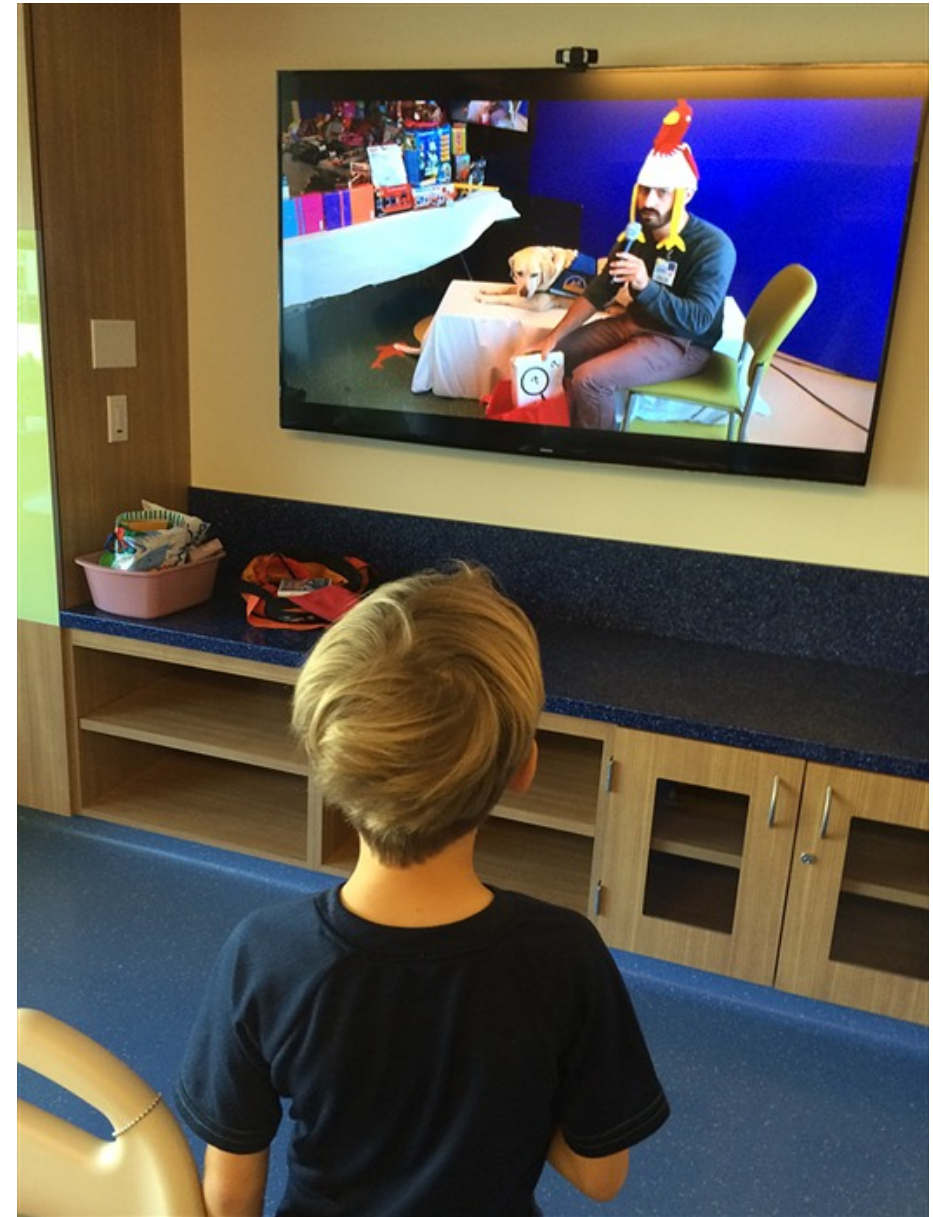


Volume -



Volume +

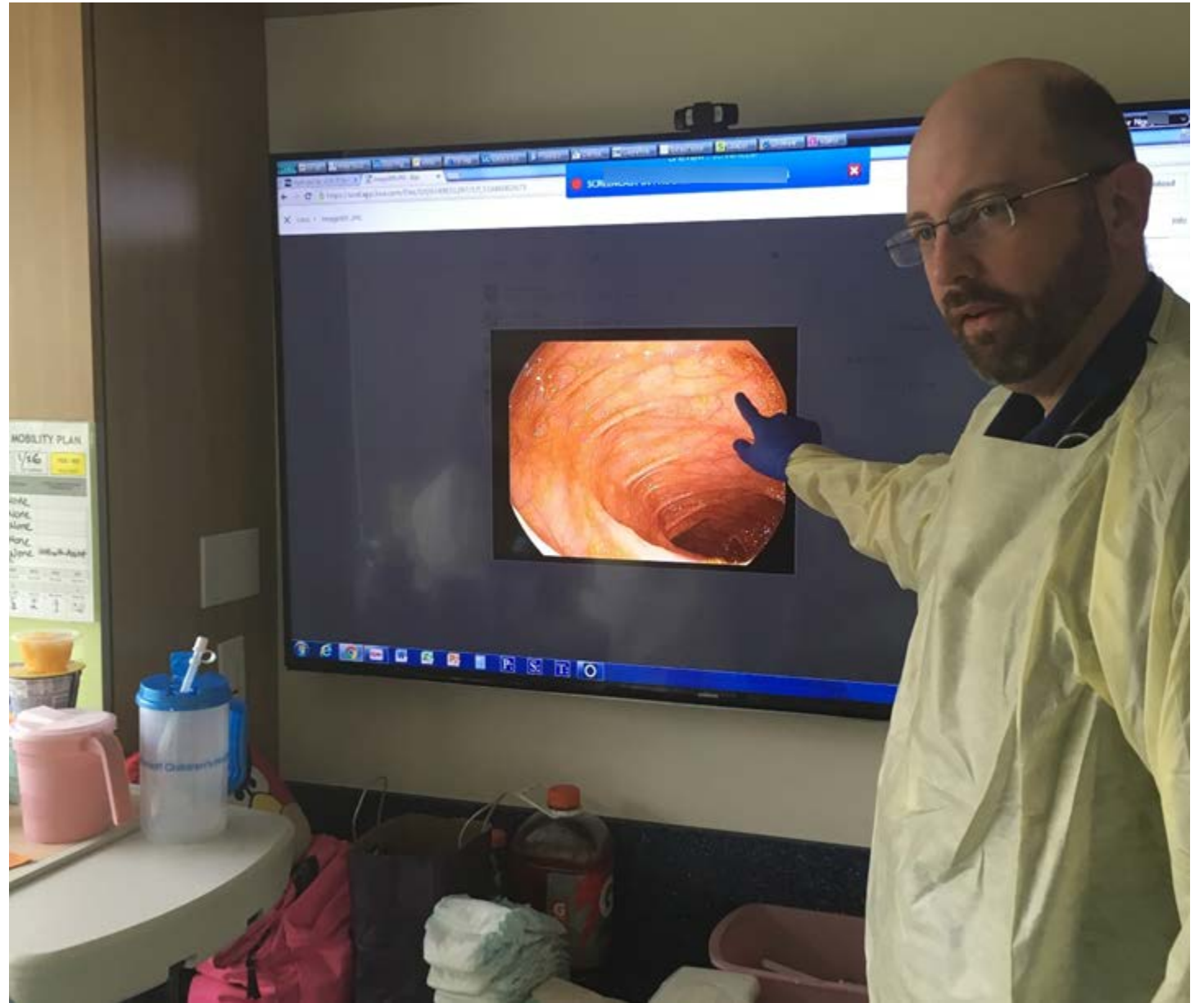
# School and Child Life



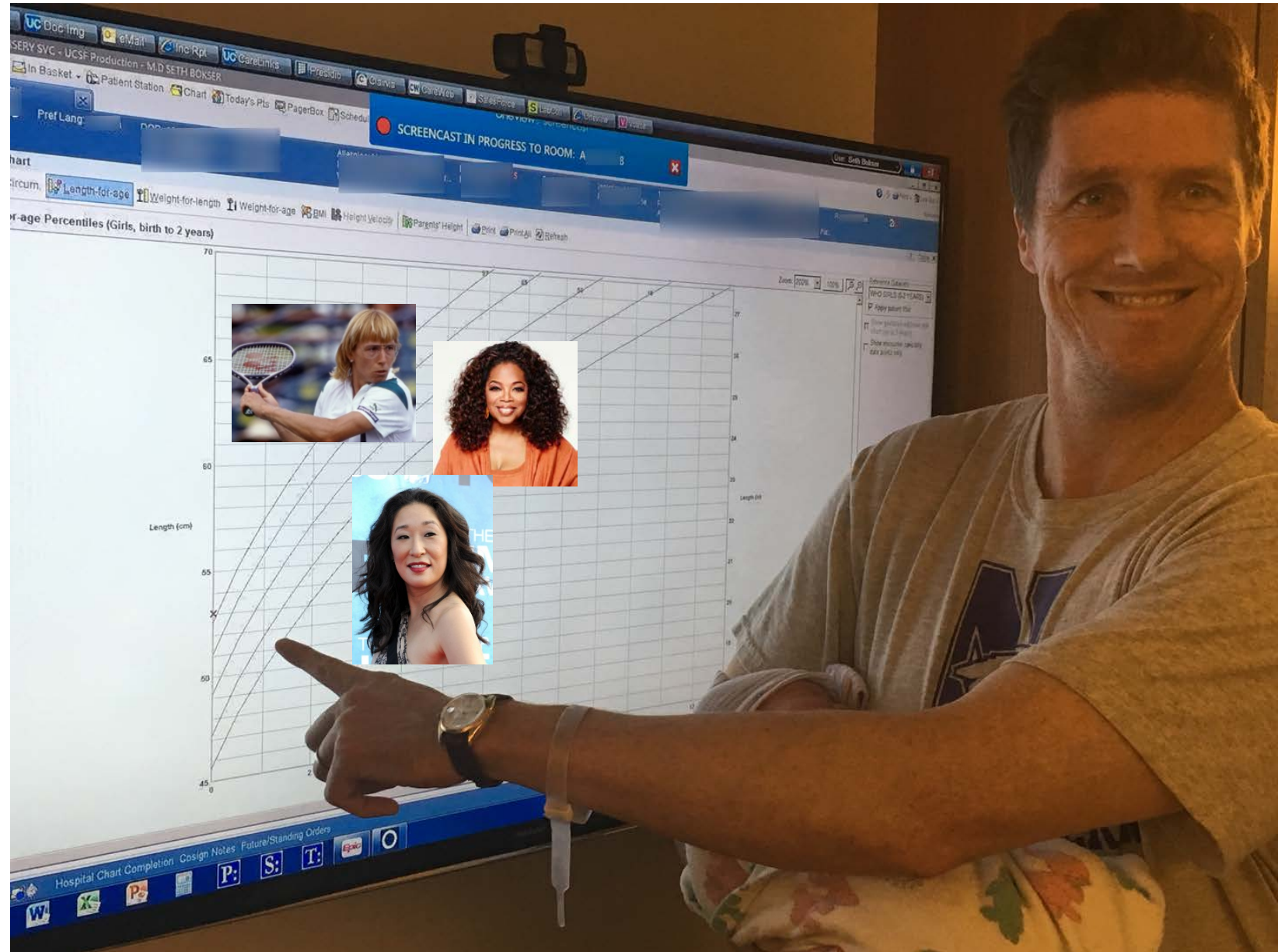
# Oneview Screencasting



# Oneview Screencasting



# Oneview Screencasting



# Patients Appreciative



Danville, CA

329 friends

541 reviews

Elite '16

★★★★★ 4/23/2015

3 check-ins

This new facility is absolutely beautiful! State of the art. You can even check in at a kiosk if the line at the desk is too long, which it usually isn't, because they've done a great job breaking up departments.

I haven't been in a room, but I hear they are state of the art. Huge TVs. Ability to pick movies and even do homework on the tv. Designed to make kids feel like they are at a hotel rather than a hospital. Very cool!



157 reviews 41 reviews

Flat Screen TV. Beautiful rooms

March 15, 2015





**Bill Clinton** ✓  
@billclinton



Follow

Benioff @UCSFChildrens Hospital introduced me to some amazing patients & shared their new health technology.



RETWEETS  
536

LIKES  
1,335

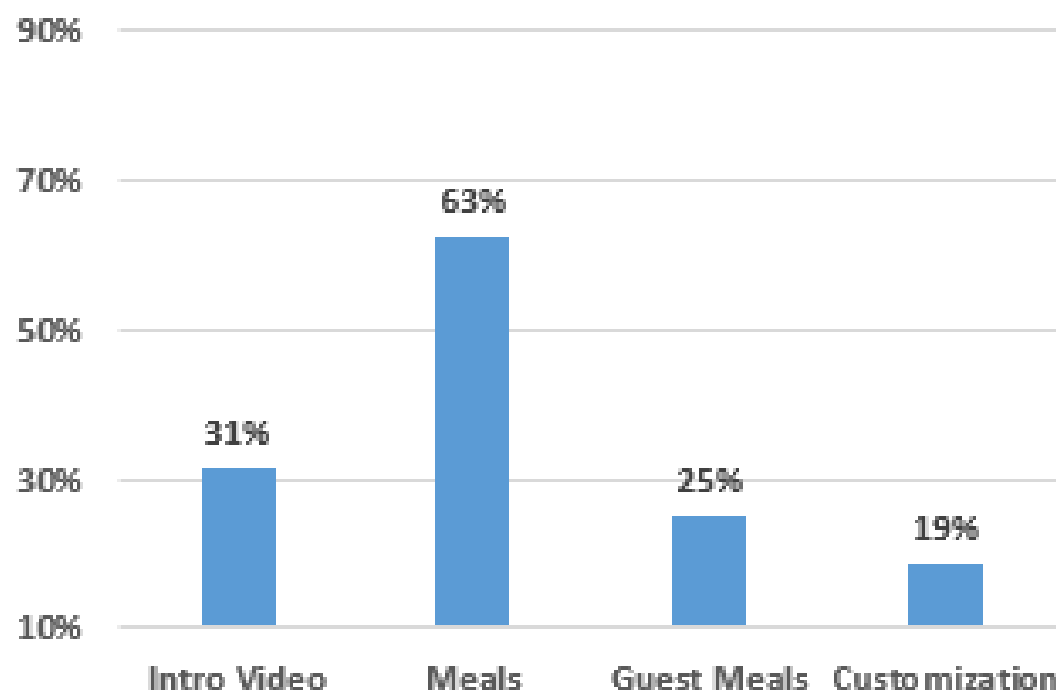
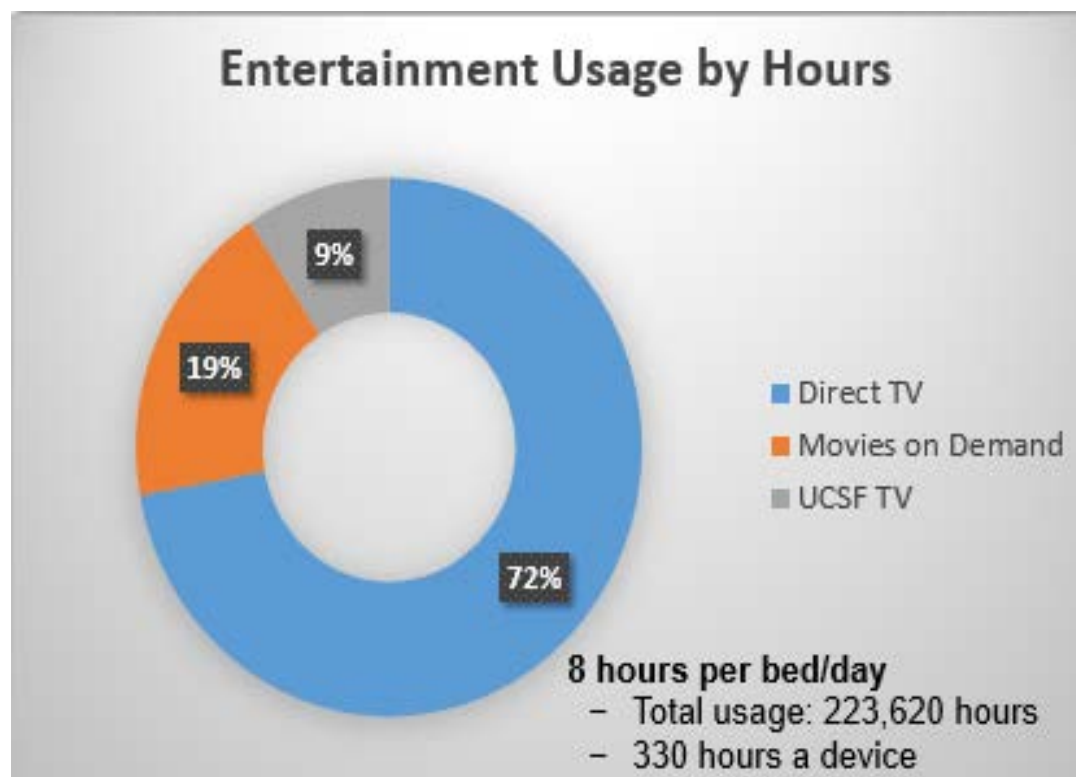


# Oneview Experience (10 months, n = 77)

	Agree	Neutral	Disagree
"Improved your hospital experience" (n=41)	75%	13%	13%
"More likely to refer friend and family." (n=77)	66%	18%	16%
"Helped you feel more <u>informed</u> during your stay" (n=56)	71%	14%	14%
"Helped you feel more <u>empowered</u> to manage your health." (n=59)	73%	15%	12%

*I really loved this integrated technology to make me feel more informed, comfortable, and welcome. - 12/6/2015 7:31 PM*

# Lessons Learned: Utilization Results 1/2016



# Video is the key trending medium to engage

## Average Time Spent per Day on Select Digital Activities by US Adult Users of Each Medium, 2011-2015

*hrs:mins*

	2011	2012	2013	2014	2015
Digital video	0:39	1:03	1:22	1:39	1:55
Social networks	1:11	1:28	1:36	1:39	1:44
Digital radio	0:53	0:55	0:56	1:00	1:05
Facebook	0:30	0:33	0:35	0:38	0:40
Pandora	0:33	0:34	0:35	0:38	0:40

*Note: ages 18+ who use each medium mentioned at least once per month; average time spent with each medium includes all time spent with that medium, regardless of multitasking or device*

*Source: eMarketer, April 2015*

188380

[www.eMarketer.com](http://www.eMarketer.com)

# Lesson Learned: IT is Your New Face to the Patient

Poll: On the last airplane flight where you used the Internet, did you experience, or see another passenger experience, IT problems with either the internet or online entertainment?

Yes: I experienced, or saw someone experiencing IT problems

No: Everything Seemed to be working well

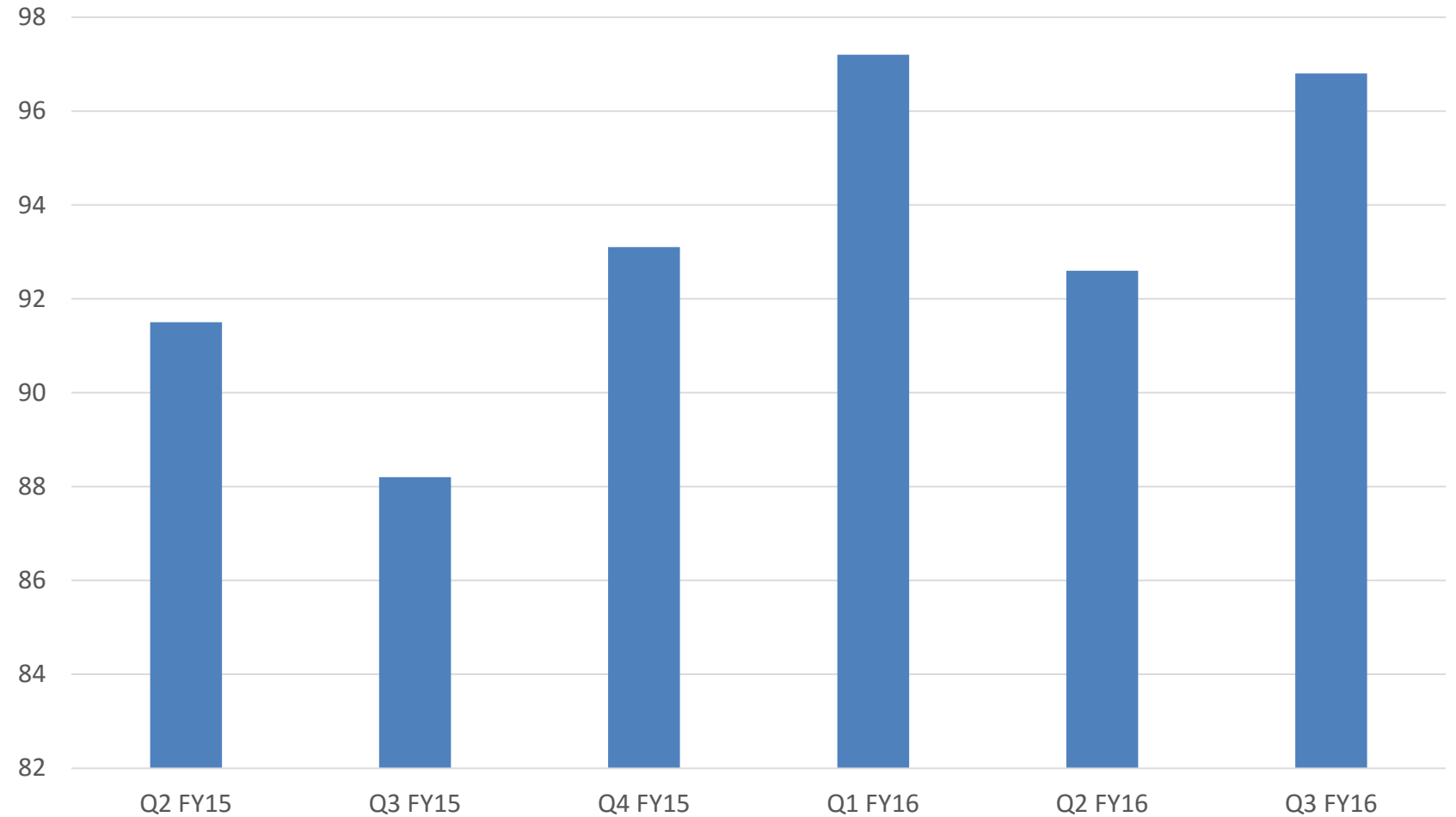


	Strengths	Weaknesses
Tethered in Room	<ul style="list-style-type: none"> <li>• Message of IT Empowerment and Equity</li> </ul>	<ul style="list-style-type: none"> <li>• Finding the right tablet arm</li> <li>• Maintenance in room</li> </ul>
Nurse Station	<ul style="list-style-type: none"> <li>• Power without cords</li> <li>• Nurse-Pt Engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Patients need to ask</li> <li>• Nurse station burden</li> </ul>
Bring Your Own	<ul style="list-style-type: none"> <li>• Patient Familiarity</li> <li>• Patient Affinity</li> </ul>	<ul style="list-style-type: none"> <li>• Haves and Have Nots</li> <li>• Tech Support Difficult</li> </ul>



# HCAPS Scores

“97% Likely to Recommend”





# Thank you



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