

Antibiotic Ninja

Seminar Presentation

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Antibiotic Ninja

Step	Task
1	Administrators customize decision trees
2	User selects the type of infection (SSTI, UTI, Respiratory)
3	Application fetches patient information from EMR
4	User inputs remaining information (i.e. symptoms, clinical history)
5	Application reports assessment and antibiotic recommendation
6	User inputs feedback about recommendation

Clinical

Symptoms

EMR

Image Findings

** Indicates required field*

Active/Recent Chemotherapy

Yes	No	Unknown
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Bite (human or animal)

Yes	No	Unknown
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Chronic Steroid Use

Yes	No	Unknown
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Chronic Wound Infection

Yes	No	Unknown
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Cirrhosis

Yes	No	Unknown
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Diabetic Foot Infection

Yes	No	Unknown
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Failed Oral Antibiotics

Yes	No	Unknown
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Immunosuppressive Medications

Yes	No	Unknown
-----	----	---------

Injection Drug Site

Yes	No	Unknown
-----	----	---------

Odontogenic Source

Yes	No	Unknown
-----	----	---------

Pregnancy

Yes	No	Unknown
-----	----	---------

Prosthetic Material at Site

Yes	No	Unknown
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Severe PCN Allergy *

Yes	No	Unknown
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Severe Peripheral Arterial Disease

Yes	No	Unknown
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Spider Bite

Yes	No	Unknown
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Surgical Site Infection

Yes	No	Unknown
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Transplant Recipient

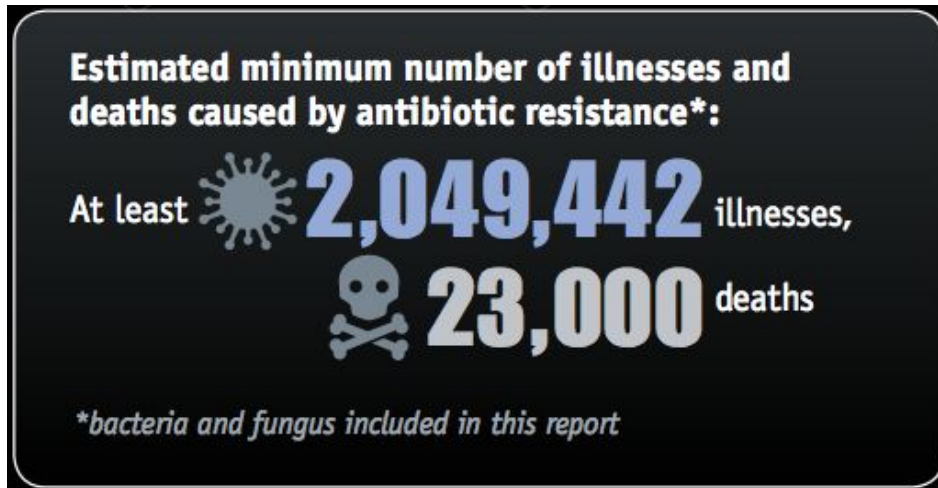
Yes	No	Unknown
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Uncontrolled (T2) Diabetes

Yes	No	Unknown
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Next

Background



- Antibiotic Stewardship
 - Promote safe and appropriate use of antibiotics
- Clinical Decision Support System (CDSS)
 - Use patient information to produce an antibiotic recommendation
 - Standardize antibiotic prescription practices

Background



Barriers to success:

- **Adoption**
 - Useful product without fit into clinical workflow
- **Acceptance**
 - Product is not useful despite fit into clinical workflow

Literature

- **Zaidi, Syed Tabish R., Jennifer L. Marriott, and Roger L. Nation. "The Role of Perceptions of Clinicians in Their Adoption of a Web-based Antibiotic Approval System: Do Perceptions Translate into Actions?" *International Journal of Medical Informatics* 77.1 (2008): 33-40. Print.**
- Sittig, Dean F., Michael A. Krall, Richard H. Dykstra, Allen Russell, and Homer L. Chin: "A Survey of Factors Affecting Clinician Acceptance of Clinical Decision Support." *BMC Medical Informatics and Decision Making* 6.1 (2006). Print.

Factors Affecting Clinical Adoption of a CDSS

Background:

- The Royal Melbourne Hospital in Australia
- Antibiotic approval methods:
 - Call ID and gain approval over the phone
 - Use iApprove System
- During trial period, iApprove was optional to use



The Royal
Melbourne Hospital



vs.



Factors Affecting Clinical Adoption of a CDSS

Question: Do perceptions of a CDSS affect its adoption?

Methodology:

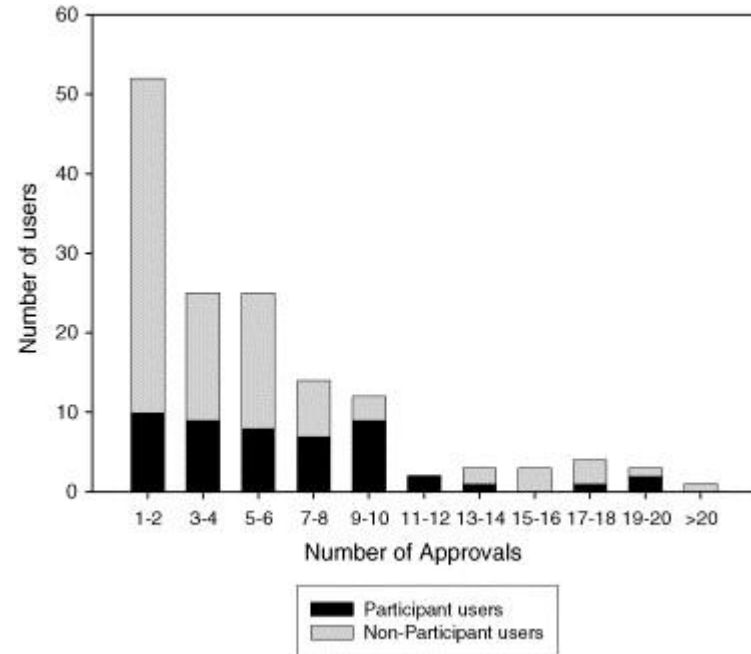
- Surveyed 3 types of clinicians
- 3 types of questions
 - Computer use
 - CDSS ease of use
 - CDSS effectiveness
- Number of approvals
- Data analysis
 - Mean, median, proportion

Clinician Survey (incomplete)	
Computer use	Weekly time spent
	Self rated "sophistication"
	Use during specific tasks (documentation, lab results, etc.)
iApprove ease of use	Learn how to use
	Login and logout
	Calculate dosage
iApprove usefulness	Increase knowledge of evidence-based diagnosis
	Improve adherence to evidence-based practice

Factors Affecting Clinical Adoption of a CDSS

Results:

- More use of iApprove
 - Self-rated computer sophistication
 - Frequent computer use for other tasks
 - Easy to learn, easy to show others, and easy to fit into workflow
- Less use of iApprove
 - Number of years of clinical experience



Factors Affecting Clinical Adoption of a CDSS

Pros	Cons
<ul style="list-style-type: none">● Analysis of computer use and perceptions of use and their correlation with adoption● CDSS was not required to be used	<ul style="list-style-type: none">● Limited to one CDSS in one hospital● Small sample size of physicians surveyed● Does not investigate specific features affecting adoption

Relevance:

- Increase perceived ease of use and usefulness
 - Intuitive login/logout procedures
 - Instructions and further information readily available

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- Zaidi, Syed Tabish R., Jennifer L. Marriott, and Roger L. Nation. "The Role of Perceptions of Clinicians in Their Adoption of a Web-based Antibiotic Approval System: Do Perceptions Translate into Actions?" *International Journal of Medical Informatics* 77.1 (2008): 33-40. Print.
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Factors Affecting Clinical Acceptance of a CDSS

Background:

- Multiple hospitals and providers across northwestern United States
- Multiple CDSSs implemented at various hospitals in this group



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Factors Affecting Clinical Acceptance of a CDSS

Question: What factors lead to clinical acceptance of support generated by a CDSS?

Methodology:

- Surveyed physicians
- Questions related to factors:
 - Patient
 - Provider
 - Alert
 - Environment
- Scaled or open ended response

Data Analysis:

- Scaled response
 - Mean, standard deviation, range
- Open ended response
 - Encoded and tabulated responses

Factors Affecting Clinical Adoption of a CDSS

Results:

- Provider factors:
 - 80% of physicians less likely to accept clinical decision support when behind schedule
 - 84% of physicians reported 20 minutes behind schedule
- Patient factors:

	More likely	Less likely	Equally likely
Elderly patients (> 65 years old)	40%	11%	49%
Many current medications (> 5)	36%	15%	49%
Many chronic conditions (>5)	36%	20%	44%
Presenting with Acute Problem	9%	59%	32%

Factors Affecting Clinical Acceptance of a CDSS

Pros	Cons
<ul style="list-style-type: none">● Identified provider and patient related factors correlated with clinical acceptance or rejection of decision support	<ul style="list-style-type: none">● Small sample size (110 PCP's)● Qualitative and subjective responses● Correlation of specific CDSS type and acceptance

Relevance:

- CDSS must be intuitive and efficient to access and use
- Factors that put patient at high risk should be taken into consideration

Clinical

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Relevance:

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Final Takeaways

Features needed for adoption:

- Intuitive login/logout procedures
- Instructions and further information easily available

Features needed for acceptance:

- CDSS must be intuitive and efficient to access and use
- Factors that put patient at high risk should be taken into consideration

References

1. *Antibiotic Resistance Threats in the United States, 2013*. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, 2013. Print.
2. Sittig, Dean F., Michael A. Krall, Richard H. Dykstra, Allen Russell, and Homer L. Chin. "A Survey of Factors Affecting Clinician Acceptance of Clinical Decision Support." *BMC Medical Informatics and Decision Making* 6.1 (2006). Print.
3. Townsend, Jennifer, Venkat P. Gundareddy, and Jonathan M. Zenilman. "Project STEP IN: Stewardship Through Education of Providers in the Inpatient Setting: Implementation Guide to Establish Antimicrobial Stewarding Practices among Hospitalists and Other Hospitalist Clinicians." Society of Hospital Medicine, 2016.
4. Zaidi, Syed Tabish R., Jennifer L. Marriott, and Roger L. Nation. "The Role of Perceptions of Clinicians in Their Adoption of a Web-based Antibiotic Approval System: Do Perceptions Translate into Actions?" *International Journal of Medical Informatics* 77.1 (2008): 33-40. Print.

Questions?