

# Influencing Antibiotic Prescribing Behavior: Outpatient Practices

*Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria*

*September 13, 2017*

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# Take Home Points

- ***Doctors are people too***
- ***Doctoring is an emotional, social activity***
- ***Diagnostics are not the answer***
  
- ***Behavioral principles***
  - Decision fatigue
  - Partitioning
  - Pre-commitment
  - Accountable justifications
  - Peer comparison



# Changing Behavior

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- ***Implicit model:*** clinicians reflective, rational, and deliberate
  - “Educate” and “remind” interventions
- ***Behavioral model:*** decisions fast, automatic, influenced by emotion and social factors
  - Use cognitive biases
  - Appeal to clinician self-image
  - Consider social motivation

# Imbalance in Factors Related to Antibiotic Prescribing

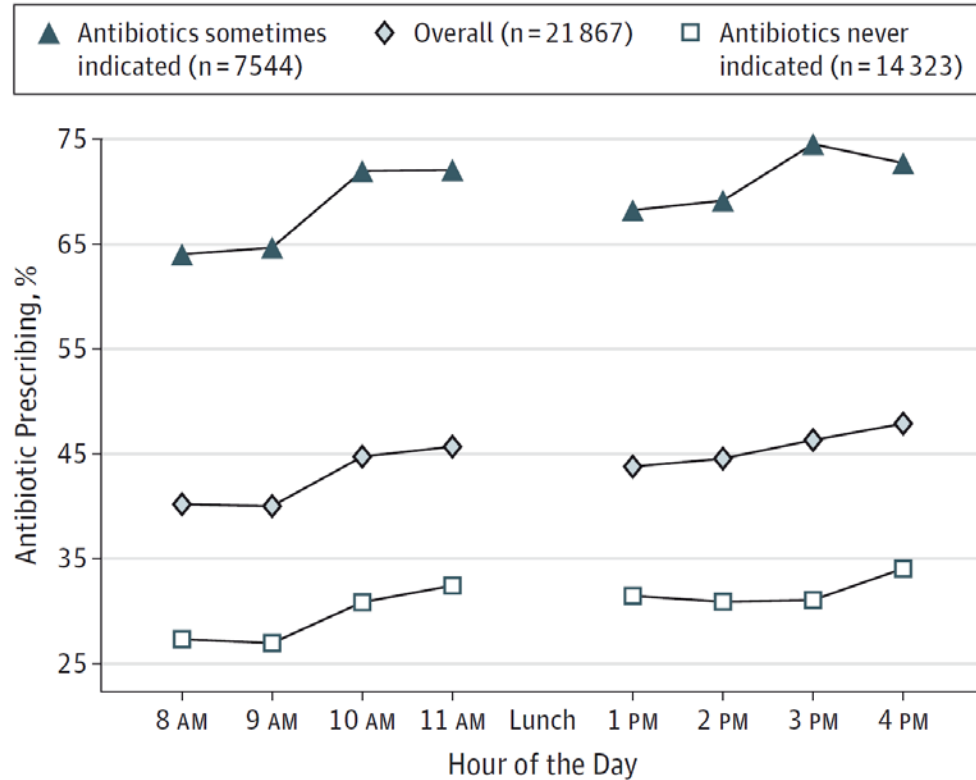
## Factors Driving Antibiotic Prescribing: Immediate and Emotionally Salient

- Belief that a patient wants antibiotics
- Perception that it is easier and quicker to prescribe antibiotics than explain why they are unnecessary
- Habit
- Worry about serious complications and “just to be safe” mentality

## Factors Deterring Antibiotic Prescribing: More Remote and Less Emotionally Salient

- Risks of adverse reactions and drug interactions
- Recognizing the need for antibiotic stewardship
- Desire to deter low-value care and decrease unnecessary health care spending
- Prefer to follow guidelines

# Antibiotic Prescribing by Hour of the Day





## Nudging Physician Prescription Decisions by Partitioning the Order Set: Results of a Vignette-Based Study

*David Tannenbaum, PhD<sup>1</sup>, Jason N. Doctor, PhD<sup>2</sup>, Stephen D. Persell, MD, MPH<sup>3</sup>, Mark W. Friedberg, MD, MPP<sup>4,5,8</sup>, Daniella Meeker, PhD<sup>6</sup>, Elisha M. Friesema, BA<sup>3</sup>, Noah J. Goldstein, PhD<sup>7</sup>, Jeffrey A. Linder, MD, MPH<sup>5,8</sup>, and Craig R. Fox, PhD<sup>7</sup>*

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# Partitioning

## *Acute Bronchitis*

### OTC medications grouped

Of the drug choices below, please indicate which drugs you would choose in treating this patient. You may select up to three options.

- albuterol inhaler
- an antibiotic of your choice
- robitussin with codeine
- tessalon perles

Over-the-counter drugs:

- cough lozenge
- cough spray
- cough syrup

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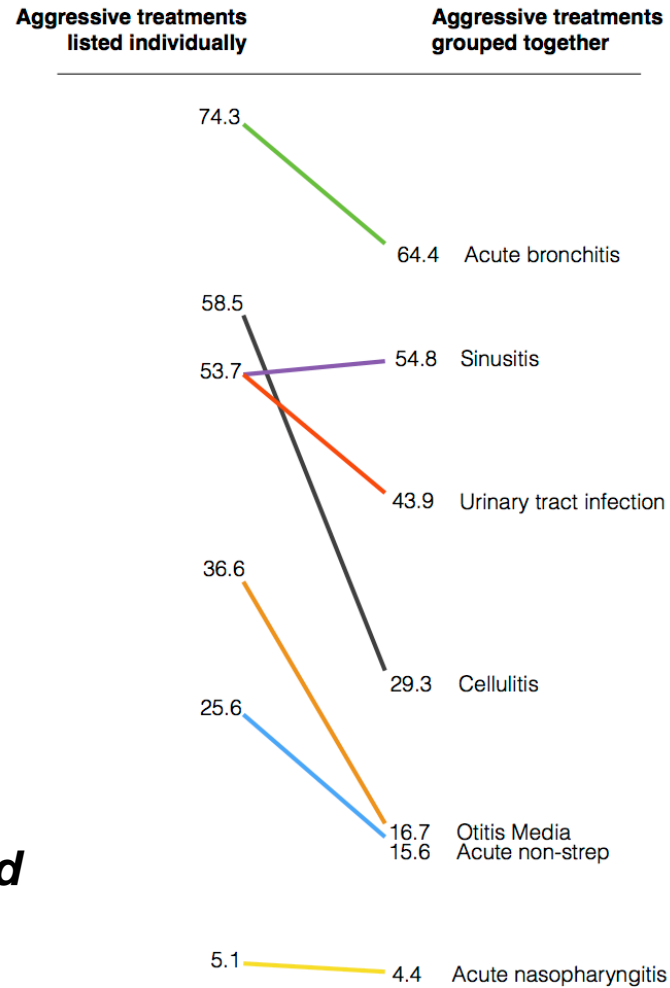
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  - Positioning of grouped items
- **Overall, 12% decrease in choosing aggressive treatment when grouped**



## Safe Antibiotic Use: A Letter From Your Medical Group

### Dear Patient,

We want to give you some important information about antibiotics.

Antibiotics, like penicillin, fight infections due to bacteria that can cause some serious illnesses. But these medicines can cause side effects like skin rashes, diarrhea, or yeast infections. If your symptoms are from a virus and not from bacteria, you won't get better with an antibiotic, and you could still get these bad side effects.

Antibiotics also make bacteria more resistant to them. This can make future infections harder to treat. This means that antibiotics might not work when you really need them. Because of this, it is important that you only use an antibiotic when it is necessary to treat your illness.

How can you help? Carefully follow your doctor's instructions. He or she will tell you if you should or should not take antibiotics.

When you have a cough, sore throat, or other illness, your doctor will help you select the best possible treatments. If an antibiotic would do more harm than good, your doctor will explain this to you, and may offer other treatments that are better for you.

Your health is very important to us. As your doctors, we promise to treat your illness in the best way possible. We are also dedicated to avoid prescribing antibiotics when they are likely to do more harm than good.

If you have any questions, please feel free to ask your doctor, nurse, or pharmacist.

Sincerely,



## El Uso Seguro de Antibióticos: Una Carta de su Grupo Médico

### Estimado Paciente:

Queremos compartir información importante con usted sobre los antibióticos.

Los antibióticos como la penicilina ayudan a combatir infecciones debido a bacterias que pueden causar serias enfermedades. Pero estas medicinas también tienen efectos secundarios como erupciones de la piel, diarrea, o infecciones por hongos de levadura. Si sus síntomas son debidos a un virus y no por una bacteria, no se mejorará con un antibiótico, y usted aún puede obtener estos efectos secundarios no deseables.

Los antibióticos también pueden hacer la bacteria más resistente a ellas. Esto hará que infecciones en el futuro sean más difíciles de tratar. Eso significa que los antibióticos no trabajarán cuando usted en realidad necesitan que funcionen. Por esto, es importante que usted sólo use un antibiótico cuando sea necesario para su enfermedad.

¿Cómo puede usted ayudar? Siga las indicaciones de su doctor. El o ella le dirá si debe o no tomar antibióticos.

Cuando usted tenga una tos, garganta irritada, u otra enfermedad, su doctor le ayudará a escoger el mejor tratamiento posible. Si un antibiótico haría más daño que bien, su doctor le explicará esto y tal vez le ofrecerá otros tratamientos que sean mejor para usted.

Su salud es importante para nosotros. Como sus doctores, nosotros prometemos tratar su enfermedad en la mejor manera posible. También nos comprometemos a evitar recetar antibióticos cuando sean probables de hacer más daño que bien.

Si tiene cualquier pregunta, pregúntele a su doctor, enfermera, o farmacéutico.

Atentamente,



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When you have a cough, sore throat, or other illness, ask your doctor about the best possible treatments. If an antibiotic is needed, your doctor will explain this to you, and you should take it exactly as directed.

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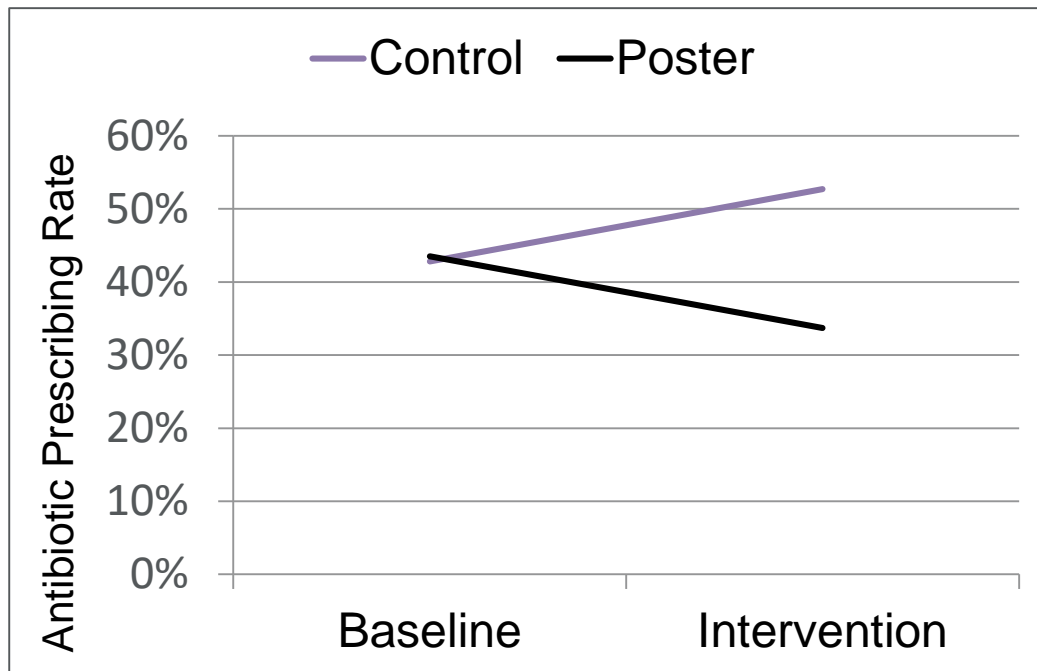
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# Public Commitment: Results



Adjusted difference-in-differences: -20% (-6% to -33%)



# CDC Replications: IDPH & NYSDH



Internal use only.  
Do not distribute.

## PDSB Campaign Goals

- Increase **provider and patient knowledge** & provide **resources** about antibiotic resistance and use

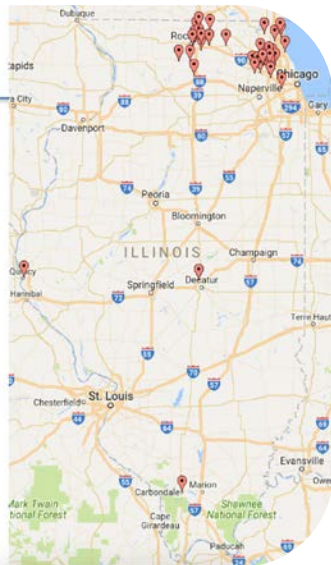
## Phase I Participation

March 2015



Present

- 55 practices representing > 385 providers



## CDC Core Elements Outpatient Antibiotic Stewardship (2017)

## EU Draft Guidelines for Antibiotic Stewardship



The NYS Department of Health recently rolled out a “Get Smart Guarantee” poster for healthcare providers to pledge to only prescribe antibiotics when they are needed.

Original Investigation

# Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices A Randomized Clinical Trial

Daniella Meeker, PhD; Jeffrey A. Linder, MD, MPH; Craig R. Fox, PhD; Mark W. Friedberg, MD, MPP;  
Stephen D. Persell, MD, MPH; Noah J. Goldstein, PhD; Tara K. Knight, PhD; Joel W. Hay, PhD; Jason N. Doctor, PhD

**IMPORTANCE** Interventions based on behavioral science might reduce inappropriate antibiotic prescribing.

◀ Editorial page 558

➕ Supplemental content at  
[jama.com](http://jama.com)



## Specific Aim

- To evaluate 3 behavioral interventions to reduce inappropriate antibiotic prescribing for acute respiratory infections
  - 3 health systems using 3 different EHRs



# Interventions

1. Suggested Alternatives
2. Accountable Justification
3. Peer Comparison

## Intervention 2: Accountable Justification

BestPractice Advisory - Zztest,Bearistudyfive


▼ Text Alerts (1 Advisory)

▼ Antibiotics are not generally indicated for acute bronchitis

▼ Justifications (1 Advisory)

▼ You have prescribed antibiotics for a likely viral diagnosis. Please click the Enter Justification button below and write your justification for prescribing antibiotics in the comment box. This justification will be entered into the patient's record.

If you do not enter a justification into the comment box, the phrase "No justification for prescribing antibiotics was given." will appear in the patient's record. Click Accept when you are finished.

Acknowledge reason: Not Done-Medical Reason  [Close](#)

Patient has asthma

[Click this box and enter ARI justificati...](#)

Accept & Stay    Accept    Cancel



# Intervention 3: Peer Comparison

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### ***“You are a Top Performer”***

You are in the top 10% of clinicians. You wrote 0 prescriptions out of 21 acute respiratory infection cases that did not warrant antibiotics.

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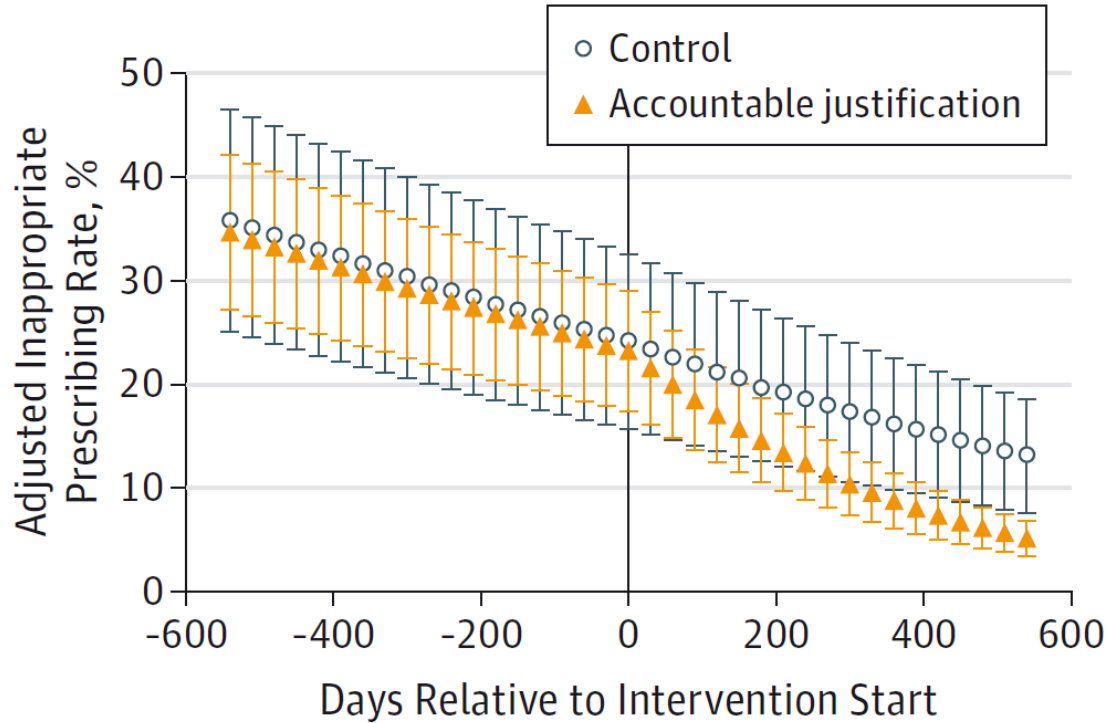
You are in the top 10% of clinicians. You wrote 0 prescriptions out of 21 acute respiratory infection cases that did not warrant antibiotics.

### ***“You are not a Top Performer”***

Your inappropriate antibiotic prescribing rate is 15%. Top performers' rate is 0%. You wrote 3 prescriptions out of 20 acute respiratory infection cases that did not warrant antibiotics.

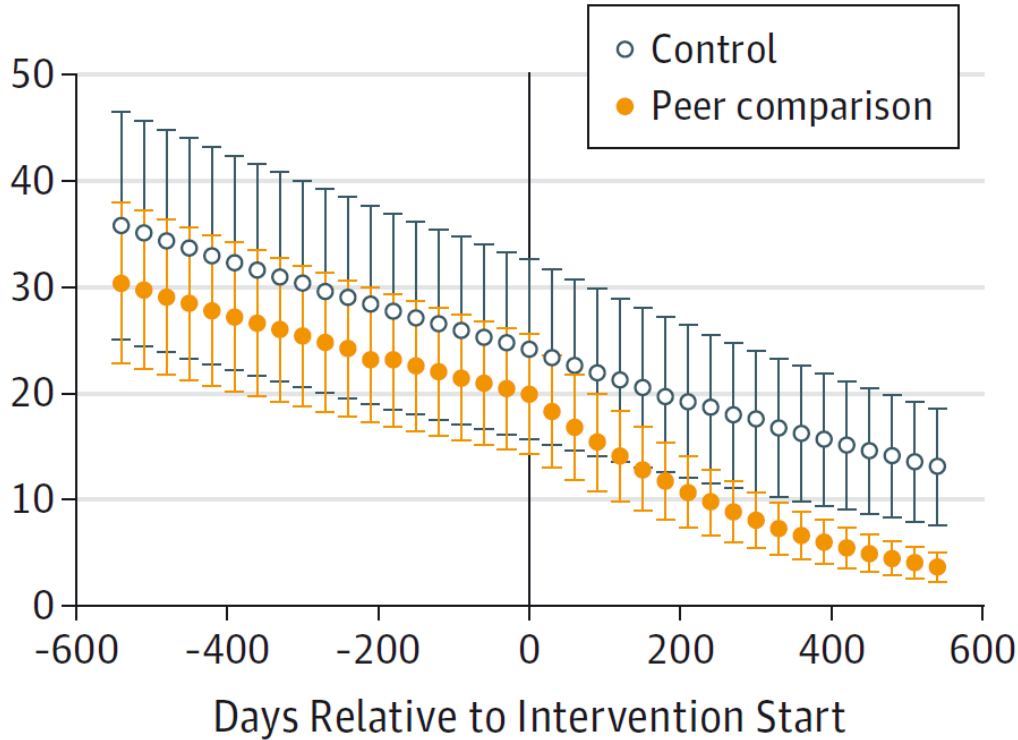


# Main Results: Accountable Justification



-7%  $p < .001$

# Main Results: Peer Comparison



-5%  $p = <.001$



# **Diagnostics are Not the Answer**

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# Summary: Behavioral Interventions

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- ***Doctoring is an emotional, social activity***
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- ***Behavioral principles***
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  - Partitioning
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  - Accountable justifications
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**Thank You**

***Questions? Conversation?***

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# References

1. Mehrotra A, Linder JA. Tipping the balance toward fewer antibiotics. *JAMA Intern Med.* 2016;176(11):1649-1650.
2. Linder JA, Doctor JN, Friedberg MW, et al. Time of day and the decision to prescribe antibiotics. *JAMA Intern Med.* 2014;174(12):2029-2031
3. Tannenbaum D, Doctor JN, Persell SD, et al. Nudging physician prescription decisions by partitioning the order set: results of a vignette-based study. *J Gen Intern Med.* 2015;30(3):298-304.
4. Meeker D, Knight TK, Friedberg MW, et al. Nudging guideline-concordant antibiotic prescribing: a randomized clinical trial. *JAMA Intern Med.* 2014;174(3):425-431.
5. Meeker D, Linder JA, Fox CR, et al. Effect of behavioral interventions on inappropriate antibiotic prescribing among primary care practices: a randomized clinical trial. *JAMA.* 2016;315(6):562-570.