Influencing Antibiotic Prescribing Behavior: Outpatient Practices

*Presidental Advisory Council on Combating Antibiotic-Resistant Bacteria*

*September 13, 2017*

*Jeffrey A. Linder, MD, MPH, FACP*

Professor of Medicine and Chief
Division of General Internal Medicine and Geriatrics
Northwestern University Feinberg School of Medicine

jlinder@northwestern.edu   @jeffreylinder
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

• Limited success of prior interventions
Changing Behavior

• Limited success of prior interventions

• *Implicit model*: clinicians reflective, rational, and deliberate
  – “Educate” and “remind” interventions
Changing Behavior

• Limited success of prior interventions

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

David Tannenbaum, PhD¹, Jason N. Doctor, PhD², Stephen D. Persell, MD, MPH³, Mark W. Friedberg, MD, MPP⁴,⁵,⁸, Daniella Meeker, PhD⁵, Elisha M. Friesema, BA³, Noah J. Goldstein, PhD⁷, Jeffrey A. Linder, MD, MPH⁶,⁸, and Craig R. Fox, PhD⁷

¹UCLA Anderson School of Management, Los Angeles, CA, USA; ²Leonard D. Schaeffer Center for Health Policy and Economics, University of Southern California, Los Angeles, CA, USA; ³Division of General Internal Medicine and Geriatrics, Center for Healthcare Studies, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA; ⁴RAND, Boston, MA, USA; ⁵Harvard Medical School, Boston, MA, USA; ⁶Department of Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA; ⁷UCLA Anderson School of Management, Department of Psychology, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA; ⁸Division of General Medicine and Primary Care, Brigham and Women’s Hospital, Boston, MA, USA.
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
- □ tessaion perles

Over-the-counter drugs:
- □ cough lozenge  □ cough spray  □ cough syrup
Partitioning

Acute Bronchitis

Prescription 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.

- □ cough lozenge
- □ cough spray
- □ cough syrup

Prescription drugs:
- □ albuterol inhaler
- □ an antibiotic of your choice
- □ robitussin with codeine
- □ tessalon perles
• 84 primary care clinicians
• 7 vignettes
• Randomized
  – Prescription meds grouped
  – Broader-spectrum grouped
  – Vignette order
  – Positioning of grouped items
• 84 primary care clinicians
• 7 vignettes
• Randomized
  – Prescription meds grouped
  – Broader-spectrum grouped
  – Vignette order
  – 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 treatment. 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 not 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,

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 estos medicamentos también tienen efectos secundarios como erupciones de la piel, diarrea, o infecciones por hongos de la vejiga. Si sus síntomas son debido a un virus y no por una bacteria, no se mejorará con un antibiótico; y usted aún puede obtener estos efectos secundarios no deseados.

Los antibióticos también pueden hacer la bacteria más resistente a ellos. Esto hará que las infecciones en el futuro sean más difíciles de tratar. Esto significa que los antibióticos no trabajan si cuando usamos en realidad necesitan que funcionen. Por esta razón, es importante que usted sólo utilice un antibiótico cuando sea necesario para su enfermedad.

¿Cómo puede usted ayudar? Sigas las indicaciones de su doctor: Él o ella dirá si debe o no tomar antibióticos.

Cuando usted tenga una tos, gárgaras 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 sugerirá otro tratamiento que sea mejor para usted.

Su salud es importante para nosotros. Como sus doctoros, nosotras prometemos tratar su enfermedad de 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,
Dear Patient,

We want to give you some important information about antibiotics.

Antibiotics, like penicillin, fight infections due to bacteria that can cause 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 advice. You should or should not take antibiotics.

When you have a cough, sore throat, or other illness, it is always best possible treatments. If an antibiotic is prescribed, your doctor will explain this to you again.

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,

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.

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 la vejiga. Si sus síntomas son debido a un virus y no por una bacteria, no se mejorará con un antibiótico, y usted aún puede obtener estos efectos secundarios no deseados.

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 ustedes en realidad necesitan que funcionen. Por esta razón estamos aquí para asegurarse que nosotros no les recetemos antibióticos en cuadros que no son realmente infecciones bacterianas.

Su salud es importante para nosotros. Como sus doctores, nosotros prometemos tratar su enfermedad de la manera más adecuada 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,
Public Commitment: Results

Adjusted difference-in-differences: -20% (-6% to -33%)
CDC Replications: IDPH & NYSDH

PDSA 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 Meekeer, 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

IMPORTANTCE  Interventions based on behavioral science might reduce inappropriate antibiotic prescribing.
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

Patient has asthma
Intervention 3: Peer Comparison
“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.
Intervention 3: Peer Comparison

“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.

“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
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
Summary: Behavioral Interventions

- **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
Thank You

Questions? Conversation?

jlinder@northwestern.edu  @jeffreylinder
References


