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/	Member Briefings April 2018 y: E. Robert Feroli, PharmD, FASHP
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FDA Requirements for Linear and 2D Data Matrix Barcodes

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Office of Medication Error Prevention and Risk Management (OMEPRM)
Office of Surveillance and Epidemiology (OSE)

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Office of Drug Security, Integrity and Response (ODSIR)
Office of Compliance (OC)

Center for Drug Evaluation and Research (CDER)

DRAFT U.S. Food and Drug Administration (FDA)

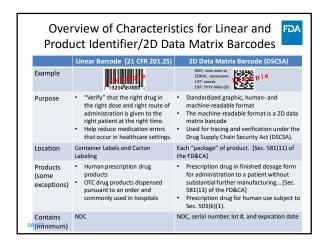
Objectives

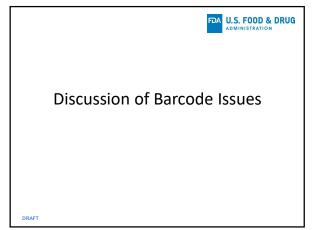


- Understand the U.S. regulatory requirements for:
 - Linear barcodes
 - 2D data matrix barcodes
- Discuss commonly reported barcode issues

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Linear Barcodes Placed Horizontally Around the Curvature of a Vial or Syringe





Source: ISMP Acute Care Newsletter, 2017 Oct 19; 22(21).

barcodes when adding other barcodes

REPORT: Linear barcodes that cannot be scanned and read

reposition linear

Missing Linear Barcodes





Source: ISMP Acute Care Newsletter, 2018 Jan 25: 23(2).

- Most human prescription drug products require a linear barcode on the container label and carton
- REPORT: Prescription drug products without a linear barcode

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Inhalation Products and Barcodes





Source: ISMP Acute Care Newsletter.

- Some inhalation products have no barcode or affixed label
- LDPE form fill and seal containers packaged without an overwrap are **excepted** from the linear barcode rule because of potential leaching and contamination related to the barcode ink.
- For new product approvals, we recommend avoiding containers that provide poor visual contrast between the container and label information or have no affixed label but deboss or emboss the information on the container itself.



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Resources



- · Linear Barcodes
 - 21 CFR 201.25

 - Guidance for industry: barcode label requirements, questions and answers (2011) https://www.fda.gov/downloads/biologicsbloodvaccines/guidancecomplianceregulatoryinformation/guidances/ucm2673 92.pdf
- Product Identifiers/2D Data Matrix Barcode under DSCSA
 - FDA's DSCSA webpage for updates and informational

 - FDA's DSCSA webpage for updates and informational resources: https://www.fda.gov/Drugs/DrugSafety/DrugIntegrityandSup plyChainSecurity/DrugSupplyChainSecurityAct/default.htm.
 The Drug Supply Chain Security Act is available at: http://www.fda.gov/DrugSJDrugSafety/DrugIntegrityandSupplyChainSecurity/DrugSupplyChainSecurityAct/ucm376829.htm.



Questions?

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AHRQ Indications RX Project Incorporating Indications into Electronic Prescriptions Gordon Schiff, MD Associate Professor, Harvard Medical School Associate Dir Brigham Center for Patient Safety Research and Practice Quality and Safety Director HMS Center for Primary Care Pamela Garabedian, MS Project Specialist - Human Factors/User Experience Researcher, Brigham and Women's Hospital and Partners HealthCare BECCHAM AND WOMEN'S HOSPITAL AND MEDICAL SCHOOL COMMENTS HOSPITAL AND MARKAD MEDICAL SCHOOL COMMENT

Conflict of Interest

Gordon Schiff, MD

Pamela Neri Garabedian, MS

No real or apparent conflicts of interest to report.

Indications Project Funded by U.S. Agency for Healthcare Research and Quality <u>AHRQ HIT Safety Grant</u> HS23694

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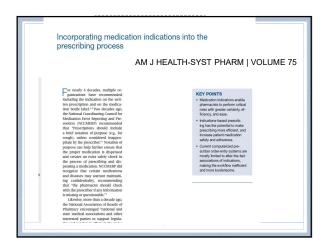
Agenda

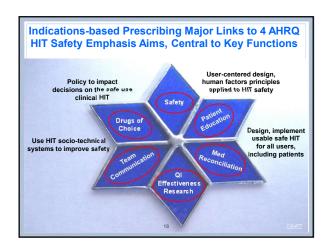
- Background & rationale Brigham AHRQ Indications Rx project
- Summarize activities and findings from project aims 1-3
- Demonstrate BWH prototype
- · Results of prototype testing
 - Comparisons with Epic and Cerner
- Next steps
 - How might "indications first" be incorporated into EMR?
 - How can we move forward with this?

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http	://www.nccmerp.org/council/council1996-09-04.html National Coordinating Council for Medication Error Reporting and Prevention
Co	Duncil Recommendations
	Recommendations to Enhance Accuracy of Prescription Writing
The C	Council recommends:
(2	all prescription documents be legible. Verbal orders should be minimized. (See the Council's Recommendation to revouce medication throw described with Verbal Medication software and Prescriptions) prescription orders include a brief notation of purpose (e.g., for cough), unless considered inappropriate by the prescriber. Notation of purpose can help further assure that the proper medication is dispensed and creates an extra safety check in the process of prescribing and dispensing a medication. The Council does recognize, however, that certain medications and disease states may warrant maintaining confidentiality.
3.	all prescriptor velocs be written in the metric system except for the open that use standard units such as insulin, visuamis, ext. Units about the specified out rather than writing "\u00fc." The change to the use of the metric system from the archaic apothecary and avoirdupois systems will help avoir disinterpretations of these abbreviations and symbols, and miscacludations when converting to metric, which is used in product labeling and package insents.
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Overall AHRQ Project Aim

"To improve prescribing safety by redesigning medication computerized prescriber order entry (CPOE) by incorporating the medication indication into the prescription order."

3 Year Project Specific Aims

- Convene 6 <u>stakeholder expert panels</u> on rationale, multi-user needs, operational and interoperability requirements, interface design elements, limitations and barriers, and policy implications of incorporating indication into CPOE; publication of Sounding Board and White Paper
- Build <u>working prototype</u> indications-enabled CPOE using user-centered design incorporating Aim 1 recommendations
- Formally test and compare prototype to two widely deployed CPOE systems using use-case clinical scenarios re: ordering speed, error rate, user experience/satisfaction, plus usefulness and safety of the prescriptions generated for pharmacists and patients.

MSOS

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Participating Stakeholders' Organizations Betsy Lehman Center for Patient Safety and Medical Error Reduction Boesen & Snow LLC Boston Children's Hospital Brigham and Women's Hospital Caillomia State Board of Pharmacy AbbVie Academy of Managed Care Pharmacy Accreditation Council for Graduate Medical Education AHRQ Albany Medical Center American Academy of Family Physicians American Association of Colleges of Pharmacy American Board of Internal Medicine Centers for Disease Control and Prevention (CDC) Centers for Medicare & Medicaid Services (CMS) Cermer Clambraic Children's Hospital Medical Center CMI Project Colcamex Resources Cone Health Consumer Reports CVS Caremark CVS Health Dartmouth College Department of Health and Human Services Office of the National Coordinator for Health IT District of Columbia Board of Pharmacy Dr American Board of Internal Medicine American Cancer Society American Concer Society American College of Physicians American Heart Association American Medical Association (AMA) American Society of Health Systems Pharmacists Arthem Blue Cross Blue Shield Asheigh Fisher Consulting Alternahealth Baton Rouge General Hospital Baton Rouge General Hospital Bayor College of Medicine Becton Dickinson and Company

2Duke University

Participating	Stakeholders'	Organiza	tions
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Elsevier Clinical Solutions International Pharmaceutical Federation Emedeon Enhance Value Epilepsy Foundation of America Fairview Pharmacy Services First Data Bank (FDB) First DataBank
Food and Drug Administration (FDA)
Genelex
Government of Western Australia Department of

Government of Western Australia Deparation Health
Health, LLC
Harvard Medical School
Harvard Primary Care Center
Healthcare Compliance Packaging Council
Healthy Motivation
Hearst Magazine
Indian Health Service
Indiana University
Institute for Healthcare Improvement
Institute for Healthcare Improvement
Institute for Safe Medication Practices (ISMP)
International Medical Interpreters Association

Johns Hopkins University Kaiser Northwest Kaiser Permanente Kaiser Northwest
Kaiser Permanente
King Fahad Medical City
Kroger
Lee Memorial Health System
Massachusetts College of Pharmacy and Health
Sciences University (MCPHSU)
Massachusetts General Hospital
Massachusetts Pharmacy Association
Meyo Clinic Rochester
McKesson
Memorial Pediatrics
Merck & Co., Inc.
Midwestern University
Molina Healthcare
Molina Medical Solutions
Montefore Medical Center
National Academy on an Aging Society
National Alliance of State Pharmacy Associations
National Association of Boards of Pharmacy (NABP)
2National Association of Chain Drug Stores

Participating Stakeholders' Organizations

National Association of Managed Care Physicians
National Community Pharmacists Association
National Council on Patient Information and
Education (NCPIE)
National Osleoporosis Foundation
National Patient Safety Foundation

NCPDP
New York State Board of Pharmacy
NextGen Healthcare
Northwestern University
Ohio Pharmacists Association
Ohio Public Employees Retirement System
Oklahoma Health Care Authority
Omnicare, Inc.
OPERS Healthcare
Optum

Ortens Realiticale
Optumi Optuminsight, Inc.
Oregon Health and Science University
Osterhaus Pharmacy
Partners Healthcare
Patient Safety America
Patients for Patient Safety Canada
Patients for Patient Safety Canada

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PID. IIIC Plizer Pharmaceutical Research and Manufacturers of America Pharmacy HIT Collaborative Phil Burgess Consulting Point-of-Care Partners Project Patient Care Quantros, Inc. RAND Corporation

Rite Aid S and R Consulting Associates Salem Memorial District Hospital San Francisco State University

San Francisco State University
Sanofi
South Carolina Pharmacy Association
Spectrum Health
St. David's Round Rock Medical Center
Stratis Health
SUNY Buffalo
Surgescribte



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Participating Stakeholders' Organizations

The Joint Commission
The Lynx Group
The Medical Letter
The PSO Advisory
The University of Alcala de Henares
The University of Illinois at Chicago
Truven Health Analytics
Trufts Medical Genter
UCL School of Pharmacy, London
UIC College of Pharmacy
UNIC School of Pharmacy
UNIC School of Pharmacy
UNIC States Pharmacopeia (USUP)
Uniformed Services University of the Health
Sciences (USUHS)
University Catholique de Louvain
Université Laval
University of Alabama at Birmingham
University of Alabama at Birmingham
University of Teiths Columbia (UBC)
University of California Los Angeles (UCLA)
University of Colorado
University of Connecticut
University of Connecticut
University of Connecticut
University of Connecticut

University of Illinois - Chicago University of Maryland University of Mass Memorial Medical Center University of Minnesota University of Pennsylvania University of Sydney University of Sydney University of Washington US Public Health Service Vanderbill University Veterans Affairs Veterans Affairs Veterans' Association Walgreens Walgreens Walmart
Weil Cornell Medical College
Wisconsin Department of Health Services

Wisconsin Department of Health Services
Wolters Kluwer
Wolters Kluwer, Clinical Drug Information
Yale University
York University, Toronto
Zynx

Knowing Medication Indication Would Prevent These Errors*

- Rapamune (immunosuppressant) vs. Rapaflo (BPH). Consequence: organ rejection or progressive BPH
- Risperidone (schizophrenia, bipolar disorder) vs. Ropinirole (PD, RLS). Consequence: worsening of symptoms
- <u>Tramadol</u> (pain) vs. <u>Trazodone</u> (depression). Consequence: no pain relief or increase depressive mood
- <u>Lamotrigine</u> (epilepsy) vs. <u>Lamivudine</u> (HBV or IV). Consequences: seizure or liver failure/AIDS (lamivudine indications are dose dependent)
- Prozac (depression) vs. Prograf (transplant rejection). Consequence: organ rejection or worsening of depression

*ISMP List of Confused Drug Names -ISMP National Medication Error Reporting Program

Knowing Medication Indication Would Prevent These Errors*

- Brilinta (antiplatelet) vs. Brintellix (antidepressant). Consequence: bleeding risk or worsening of depression
- <u>Chlorpromazine</u> (schizophrenia) vs. <u>Chlorpropamide</u> (DM). Consequence: delusional/hallucinating symptoms or hyperglycemia
- Jantoven (anticoagulant) vs. Januvia (DM). Consequences: bleeding risk or
- Keppra (epilepsy) vs. Keflex (infection). Consequences: seizure or worsening
- $\underline{Sulfasalazine} \ (UC, \ RA) \ vs. \ \underline{Sufadiazine} \ (infection). \ Consequence: \ disease \ flare/progression or antibiotic resistance/worsening of infection$

*ISMP List of Confused Drug Names -ISMP National Medication Error Reporting Program



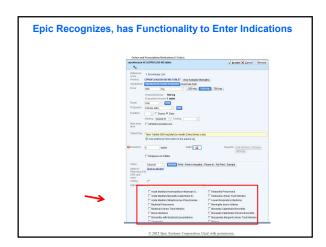
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Can drug indications be used to discriminate between LASA drugs?

- Study done in collaboration with a commercial drug knowledgebase vendor
- Compared high-level indications for commonly confused drug pairs
- Of 281 eligible LASA drug pairs (456 unique drugs)
 - 168 (60%) had no overlap in indications
 - 58 (21%) had partial overlap in indications
 - 55 (20%) had complete overlap in indications
 - Half were drugs with the same active ingredient and route of administration (e.g., Adderall, Adderall XR)

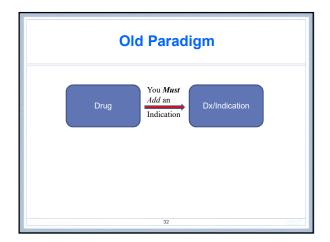
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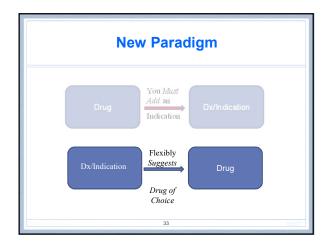
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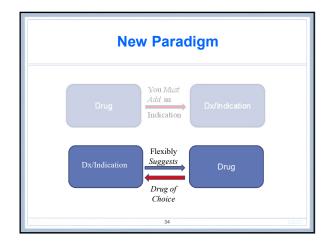


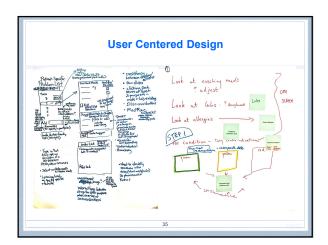
















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Methods

- Conducted 32 in-person usability tests with prototype CPOE system and commercial vendors
 - Cerner:
 - Tests done at University of Illinois Chicago
 - October 2017
 - Epic:
 - Tests done at Brigham and Women's Hospital in Boston
 - May June 2017

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Methods

- · Each usability testing session lasted 40-90 minutes
- Participants were given a brief training on the prototype and time to explore
- Participants worked through 8 clinical scenarios with the IndRx Prototype and Epic or Cerner
- The task was to review the patients history and order an appropriate medication including the indication for the pharmacist and patient
- The order of the tasks and systems was alternated to avoid bias
- A usability specialist observed, moderated and recorded the session
- Morae software was used to capture data including time and clicks
- Participants responded to the Single Ease Question (SEQ) after they completed each task and the System Usability Scale (SUS) for the prototype at the end of the test

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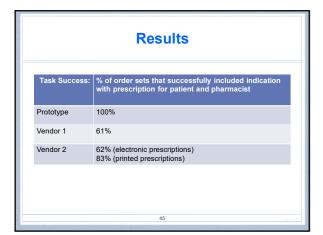
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Independent pharmacist review of order details revealed: - 5% of orders made in the *prototype* 'failed' to be appropriate for the patient and indication - 39% of orders made in *vendor 1* 'failed' to be appropriate for the patient and indication - 15% of orders made in *vendor 2* 'failed' to be appropriate for the patient and indication

<1% of orders had an LASA error in the prototype, 2.5% in vendor 1 and 2% in vendor 2

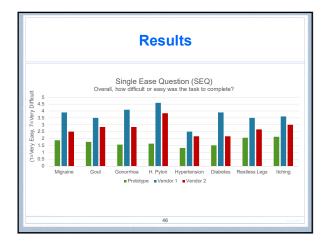
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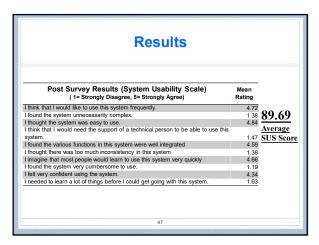
Reasons for failure include: Missing Ceftriaxone as part of therapy for Gonorrhea Missing PPI as part of therapy for h. pylori Drug for treatment of Migraine not for prevention Capsule strength not available Renal function not recommended Drug-drug interaction Dosing Instructions incorrect Conflicting sig instructions





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Next Steps Publicize, present, publish multiple project studies Continue to help create interest, will, amongst key players ISMP, HIMSS, AMIA, SGIM, IHI/NSPF, others Work with Epic, Center, other vendors to incorporate Stand alone vs. integrated "apps" to CPOE Partners potentials Develop content to support Drugs and regimens of choice Who/what is "Trusted Source" Address other challenges, thorny issues Diagnosis vs. Indication in Surescripts



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Next Steps -Actions You Can Take

- Check the EHR indication-related functionality at your institution
 - Various ways to incorporate, workaround, leverage
 - Push vendors to create functionality similar to our prototype
- P&T committees- think about how this paradigm weaves into drugs of choice; start to designate
 - Re-engineering up stream using indication, operationalize at level of drugs of choice
- Imaging all the places indication would be beneficial; document examples
 - Prevalence and incidence data
 - Common LASA errors reported locally

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Justification for Latin Prescriptions (1833)

- The Boston Medical and Surgical Journal; Sep 18, 1833
- "The question is often asked, why physicians do not write their prescriptions in English. The answer is obvious that if they did, the patient would often be less benefited than he is now."
- "The only state in which the mind can rest with any degree of satisfaction during severe illness, is that of implicit reliance in the skill of the physician, and an entire acquiescence in the course adopted, without the slightest question or argument."

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Clinician Perspective

- "Don't tell me what to do"
 - I don't want anyone taking away my clinical autonomy; especially someone who doesn't know my patient, or what is best for him or her like I do.
- "Just tell me what to do"
 - I am so frustrated with all the hassles and back and forth faxes and calls with formulary/nonformulary, prior authorization, multitiered co-payment, that....just tell me what to do and I will do it so I can move on to my next patient and work.

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Questions?



- A copy of today's slides will be posted on our website
- Don't forget to mark you calendar:
 - Our next MSOS Briefings webinar is on Thursday, June 28, 2018, 1-2pm ET.

Supported by educational grants from Novartis.





