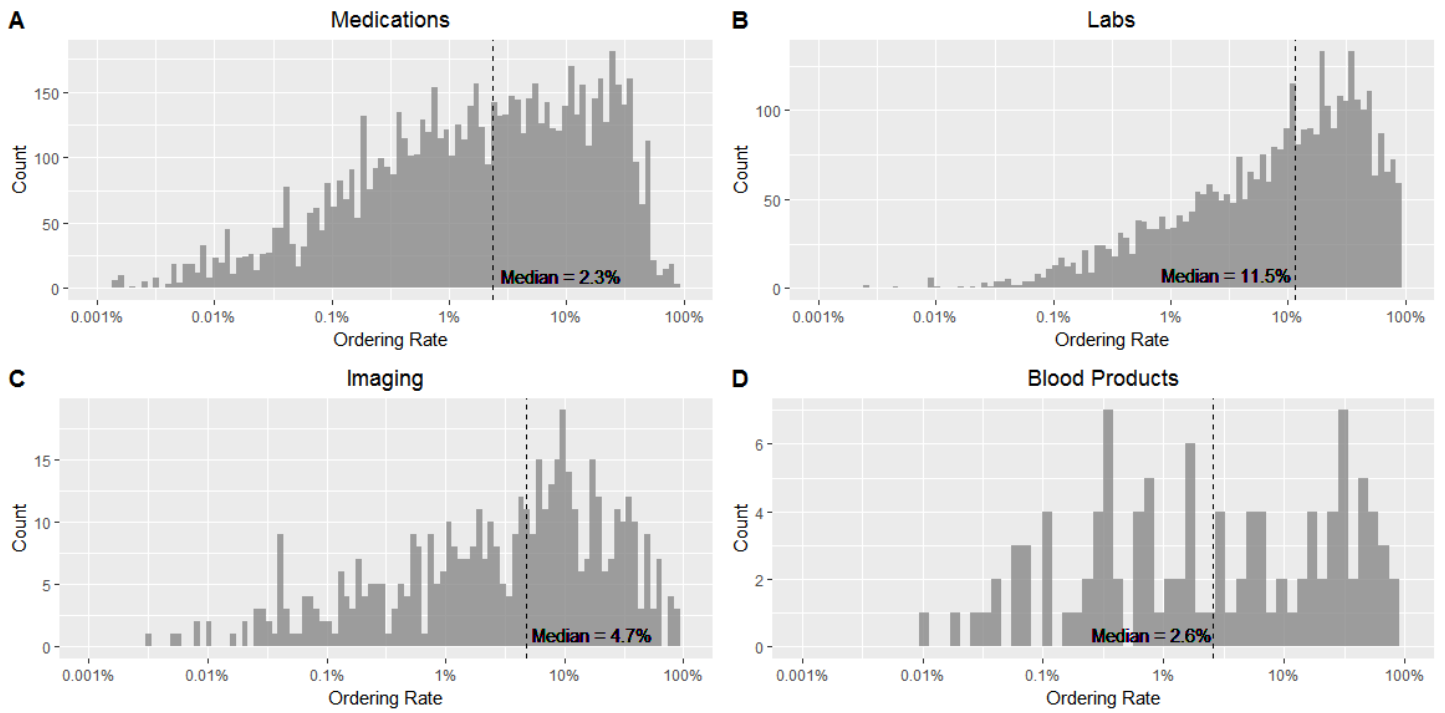


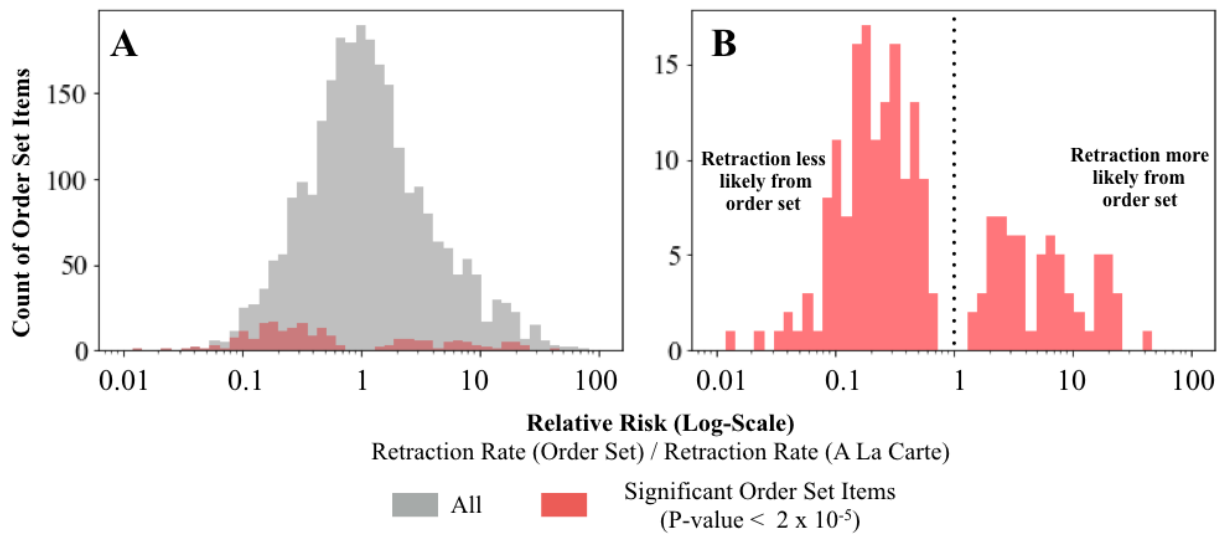
Supplementary Figure 1: Histograms of ordering rates for order set items by item type (x-axis in log10 scale). Lab items tended to have higher ordering rates from order sets than medication, imaging, and blood product items.



Supplementary Figure 2. Relative Risks of Order Retraction Within 30 Minutes. Histogram of the risks of order retraction when the medication was ordered as an order set item relative to if the same medication was ordered a la carte (x-axis in log₁₀ scale)

Panel A: Only a small proportion of the order set items had relative risks that were statistically significant at a Bonferroni corrected threshold of $p < 2 \times 10^{-5}$

Panel B: Of the significant order set items, the median relative risk among the 143 order set items from which retraction was less likely was 0.21 (range: 0.01 to 0.73) and among the 68 order set items from which retraction was more likely was 5.36 (range: 1.45 to 42.75).



Supplementary Table 1: Sections, subsections, and items of the Inpatient Congestive Heart Failure order set. For the Admission Orders and General Orders sections, only the subsections are listed without the corresponding individual order set items. Names of medication, laboratory, imaging, and other test items are also simplified from their original versions in the order set without the corresponding formulations, default dosages, and default frequencies of administration. For example, dopamine is displayed in the order set as “Dopamine IV infusion, 0-15 mcg/kg/min, Intravenous, Continuous.” Different formulations of the same medication are also listed in the order set as separate items. For example, furosemide is listed as: “Furosemide injection,” “Furosemide IV infusion,” and “Furosemide tablet.”

Order set section	Order set subsections and items
Admission Orders	Admission Bed Orders Isolation/Precautions Code Status
General Orders	Cardiac Monitoring Vital Signs Notify Physician Activity Nutrition Nursing Respiratory
Medications	<p>Vasopressors</p> <ul style="list-style-type: none"> - Dopamine - Epinephrine - Norepinephrine - Phenylephrine - Vasopressin <p>Inotropes</p> <ul style="list-style-type: none"> - Dobutamine - Milrinone <p>Recombinant Human B-type Natriuretic Peptide</p> <ul style="list-style-type: none"> - Nesiritide <p>ACE-inhibitor</p> <ul style="list-style-type: none"> - Lisinopril - Captopril - Benazepril - Enalapril <p>ARB</p> <ul style="list-style-type: none"> - Losartan - Valsartan <p>Angiotensin Receptor Blocker/Nepriylsin Inhibitor</p> <ul style="list-style-type: none"> - Sacubitril-Valsartan <p>Afterload reduction in cases of severe renal insufficiency</p> <ul style="list-style-type: none"> - Hydralazine - Isosorbide mono/dinitrate - Nitroglycerin <p>Beta Blockers</p>

- Carvedilol
- Metoprolol
- Atenolol
- Esmolol

Loop Diuretics

- Furosemide
- Bumetanide
- Torsemide
- Ethacrynic acid

Thiazide Diuretics

- Hydrochlorothiazide
- Chlorothiazide

Aldosterone Antagonist

- Spironolactone
- Eplerenone

Digoxin

Non-Opioid Analgesics

- Acetaminophen

Opioids

- Hydromorphone
- Naloxone

Sedatives

- Midazolam
- Propofol
- Dexmedetomidine

Antiemetics

- Ondansetron
- Metoclopramide
- Promethazine
- Prochlorperazine

GI Prophylaxis

- Famotidine
- Pantoprazole

Bowel Care

- Docusate
- Senna

Ophthalmic Care

- White Petrolatum

Oral Care

- Chlorhexidine

Electrolyte Replacement

- Magnesium
- Potassium

VTE Prophylaxis	Enoxaparin Heparin Coumadin
Laboratory	Complete Blood Count Basic Metabolic Panel Serum Magnesium Serum Phosphorus Hepatic Function Panel Prothrombin Time Troponin I NT-ProBNP Lipid Panel Digoxin Urinalysis
Imaging	X-ray Chest
Other Tests	ECG 12 Lead Transthoracic Echocardiogram

Supplementary Table 2 A-E: Order set usage patterns for the inpatient congestive heart failure order set, which was used a total of 921 times during our study period. (CBC = Complete blood count; IV; Intravenous, PO = By mouth)

A. CHF order set items with highest ordering rates		
Order set item	Order count	Ordering rate
Basic metabolic panel	516	56%
Serum magnesium	475	51%
CBC without differential	386	42%
Prothrombin time	284	31%
Serum phosphorus	264	29%
Hepatic function panel	262	28%
Lipid panel	181	20%
Troponin I	173	19%
Heparin injection	129	14%
Platelet count	100	11%

B. CHF order set items with lowest ordering rates		
Order set item	Order count	Ordering rate
Ceftriaxone IV	1	0.1%
Piperacillin – Tazobactam IV	1	0.1%
Nitroglycerin IV	1	0.1%
Dopamine IV	1	0.1%
Vancomycin IV	1	0.1%
Nitroglycerin ointment	1	0.1%
Pantoprazole IV	1	0.1%
Carvedilol PO	1	0.1%
Torsemide PO	1	0.1%
Famotidine PO	1	0.1%

C. CHF order set items with above zero retraction rates			
Order set item	Order count	Retraction count	Retraction rate
Carvedilol PO	1	1	100%
Lisinopril PO	3	2	33%
Hydralazine PO	11	2	18%
Dobutamine IV	6	1	17%
Isosorbide dinitrate PO	14	2	14%
Spirolactone PO	10	1	10%
Heparin injection	129	3	2%
Enoxaparin injection	44	1	2%
Furosemide IV	96	2	2%

D. Most commonly added a la carte items to CHF order set		
Additional a la carte item	Additional a la carte count	Additional a la carte ordering rate
Aspirin PO	70	7.6%
50% Dextrose IV	41	4.5%
Glucose tablet PO	40	4.3%
Atorvastatin PO	31	3.4%
Insulin lispro injection	24	2.6%
Clopidogrel PO	23	2.5%
Warfarin PO	23	2.5%
Amiodarone PO	18	2.0%
Iron PO	16	1.7%
Tamsulosin PO	15	1.6%

E. CHF order set items most commonly ordered a la carte				
Order set item	Order set ordering rate	A la carte ordering rate	A la carte/order set ordering rate ratio	P value
Senna PO	0.11%	1.63%	15	0.0005
Spironolactone PO	0.11%	0.98%	9	0.0212
Pantoprazole PO	0.33%	2.93%	9	<0.0001
Digoxin PO	0.11%	0.87%	8	0.0386
Docusate PO	0.22%	1.63%	7.5	0.0022
Carvedilol PO	0.11%	0.76%	7	0.0697
Nitroglycerin Sublingual	0.11%	0.76%	7	0.0697
Carvedilol PO	0.22%	1.41%	6.5	0.0072
Ceftriaxone IV	0.11%	0.54%	5	0.2180
Furosemide PO	0.22%	0.98%	4.5	0.0646