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How Hospital Based Order Sets Can Help Drive Practice Change and Significantly Reduce the Harm and Cost Associated with Unwarranted Variation

Using order sets within a health care organisation lowers a patient's risk of harm by providing the ordering clinician with a list of evidence-based orders to select from based on the individual patient diagnosis

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What is an order set?

Order Sets are a pre-defined, conveniently grouped set of orders relating to a condition or procedure that can be built and tailored to individual clinician and organisation preferences, with evidence-based guidance provided. They can include medications, labs, radiology, diagnostic and referrals.



The clinician's story – first year resident in ED

Imagine being a first year resident on your first day in the emergency department of a busy city hospital – and you are on your own due to an influx of patients.

A patient arrives via ambulance with suspected pneumonia.

The nurses have done their observations, put an IV line in and begun O2 via a face mask. They are waiting for you to order the necessary medications, labs, radiology and interventions.

You enter a provisional diagnosis of pneumonia within the patient record and then begin to order medications and labs BUT you haven't had to do this before and all of the senior doctors are busy.

You start to order blood cultures, but the clinical decision support advisory notes the blood cultures should be avoided in patients who are not systemically septic, have a clear source of infection and in whom a direct specimen for culture (e.g. urine, wound swab, sputum, cerebrospinal fluid, or joint aspirate) is possible.¹

ED Community-Acquired Pneumonia (1.0)
Project: ED Pneumonia Adult

Authoring 0/1 Submitted

Submit New Order New Subsection New Section New Phase Edit Delete Delete Phases Import Link Module Duplicate

Microbiology

- Blood Culture Once ; (1 of 2)
- Blood Culture Once ; (2 of 2)
- Fungus culture, sputum Once
- Gram stain, sputum Once ; culture and sensitivity
- Gram stain, culture and sensitivity, Urine , Once
- Methicillin-resistant S. aureus (MRSA) Culture, Nose, Once
- Mycoplasma pneumoniae Culture, Sputum, Once
- B. pertussis PCR, Nose, Once
- Influenza A/B PCR, Nose, Once
- Influenza A/B PCR, Sputum, Once

Guidance Comments

Blood cultures (1)

Avoid blood cultures in patients who are not systemically septic, have a clear source of infection and in whom a direct specimen for culture (e.g. urine, wound swab, sputum, cerebrospinal fluid, or joint aspirate) is possible. Blood cultures taken in an emergency department do not add more information that would aid clinical management; they also represent a significant cost. The rate of false positives in blood cultures has been reported as approximately 50% and other, more direct, tests have been shown to have a markedly higher yield – i.e. a diagnostic procedure that often results in a definitive diagnosis. Please refer to the joint ACEM/Royal Australian College of Pathologists Guideline on Pathology Testing in the Emergency Department for further guidance on appropriate pathology test requesting in emergency departments.

Supporting evidence

Cham G, Yan S, Heng BH, Seow E. Predicting positive blood cultures in patients presenting with pneumonia at an ED in Singapore. Ann Acad Med Singapore. 2009;38(6): 508-17.

Kennedy M, Bates DW, Wright SB, Ruiz R, Wolfe RE, Shapiro NI. Do emergency department blood cultures change practice in patients with pneumonia? Ann Emerg Med. 2005; 46(5):393-400.

Shah SS, Dugan MH, Bell LM, Grundmeier RW, Florin TA, Hines EM, and Metlay JP. Blood cultures in the Emergency Department Evaluation of Childhood Pneumonia. Pediatr Inf Dis J. 2011; 30(6): 475-9.

Makam AN, Auerbach AD, Steinman MA. Blood culture use in the ED in patients hospitalized for community-acquired pneumonia. JAMA Intern Med. 2014; 174(5):803.



The clinician's story – nurse practitioner remote clinic

Imagine being a nurse practitioner, the sole clinician in a remote clinic.

A child arrives at the clinic with bronchiolitis. Not having treated a child with bronchiolitis for a number of years you are unsure of the correct medications to begin treatment, but suspect that a bronchodilator such as Salbutamol may be appropriate.

However, when you look up the order set for Paediatric Bronchiolitis you read that 'with the exception of improving clinical scores in infants treated as outpatients, the evidence overwhelmingly shows that bronchodilators, including salbutamol, do not improve oxygen saturation, reduce hospital admissions or shorten the duration of hospitalisation and time to resolution of illness in children with bronchiolitis. Compared with these minimal benefits, salbutamol is associated with adverse impacts such as tachycardia, oxygen desaturation and tremors. If a bronchodilator is required, epinephrine appears to be a superior alternative to salbutamol in reducing the severity of bronchiolitis.'²

The screenshot displays a clinical decision support system interface for 'Paediatric Bronchiolitis - Ambulatory (1.0)'. The interface includes a toolbar with buttons for 'New Order', 'New Subsection', 'New Section', 'New Phase', 'Edit', 'Delete', 'Delete Phases', 'Import', 'Link Module', 'Duplicate', 'Expand All', and 'Collapse All'. The main content area is divided into two sections: 'Medications' and 'Guidance'. The 'Medications' section lists three items under 'Anesthetics':

- Glucose 254 MG/ML Oral Solution ; 0.5 mL (Once (PRN): Painful procedure); Administer 2 minutes prior to painful procedure; For less than 1 year of age
- Lidocaine 25 MG/ML / Prilocaine 25 MG/ML Topical Cream ; 1 Application(s) Once (PRN: Needle stick); Apply 60 minutes prior to needle stick, leave on no longer than 1 hour for infants weighing less than 5 kg and no longer than 2 hours for patients weighing greater than 5 kg
- Lidocaine Hydrochloride 40 MG/ML Topical Cream ; 1 Application(s) Once (PRN: Needle stick); Apply 60 minutes prior to needle stick, leave on no longer than 1 hour for infants weighing less than 5 kg and no longer than 2 hours for patients weighing greater than 5 kg

The 'Guidance' panel on the right provides detailed information, including a section for 'Add Guidance or Quality Measure' and a list of recommendations:

- Albuterol (or salbutamol) should not be administered to infants and children with a diagnosis of bronchiolitis (Evidence Quality: B; Recommendation Strength: Strong Recommendation). With the exception of improving clinical scores in infants treated as outpatients, the evidence overwhelmingly shows that bronchodilators, including salbutamol, do not improve oxygen saturation, reduce hospital admissions or shorten the duration of hospitalisation and time to resolution of illness in children with bronchiolitis. Compared with these minimal benefits, salbutamol is associated with adverse impacts such as tachycardia, oxygen desaturation and tremors. If a bronchodilator is required, epinephrine appears to be a superior alternative to salbutamol in reducing the severity of bronchiolitis.
- Epinephrine should not be administered to infants and children with a diagnosis of bronchiolitis (Evidence Quality: B; Recommendation Strength: Strong Recommendation).
- Systemic corticosteroids should not be administered to infants with a

The benefits of using order sets and the potential harm of not using order sets

Benefits

- Decrease in medication errors
- Decrease in incorrect ordering
- Decrease in double up and repeat ordering
- Decrease in variability
- Correct test – lab and rad – ordered for the diagnosis
- Reduction in harm and cost

Patient harm

- Incorrect ordering, over ordering, under ordering
- Financial burden
- Over ordering – duplication of tests, e.g. lab and radiology
- Extended stay and readmission rates

Elsevier Order Sets and the Order Set Tool

Order sets are aligned with Choosing Wisely as the orders are included in the order set for a specific reason based on diagnosis and best evidence, ensuring the clinician chooses and orders wisely to avoid issues such as those noted above, thus improving healthcare and patient outcomes.

Specific to Elsevier is an Order Set tool. This tool allows you to manage your order set build, maintenance and authoring. Use of the tool has improved clinician adoption of order sets as they are directly involved with the authoring of the order sets. Governance ensures that any discussion is tracked within the tool, and it allows easy monitoring that the right people sign off on each order set. Elsevier order sets are regularly updated, this includes guidance.

For more information about Elsevier Order Sets: www.elsevier.com/en-au/solutions/order-sets

References

1 Choosing Wisely Recommendation 134, Avoid blood cultures in patients who are not systemically septic, have a clear source of infection and in whom a direct specimen for culture (e.g. urine, wound swab, sputum, cerebrospinal fluid, or joint aspirate) is possible. Accessed 10 May 2019 at: <http://www.choosingwisely.org.au/recommendations/acem#134>

2 Choosing Wisely Recommendation 1799, Do not routinely undertake chest X-rays for the diagnosis of bronchiolitis in children or routinely prescribe salbutamol or systemic corticosteroids to treat bronchiolitis in children, Accessed on 10 May 2019 at: [http://www.choosingwisely.org.au/recommendations/paediatrics-and-child-health-division-\(racp\)#1799](http://www.choosingwisely.org.au/recommendations/paediatrics-and-child-health-division-(racp)#1799)

