RESPIRATORY COMPROMISE INSTITUTE
8618 Westwood Center Drive, Suite 210
Vienna, Virginia 22182-2273
Telephone: 703-496-5357
Website: www.respiratorycompromise.org

Respiratory Compromise Institute

Request for Applications

Funding Opportunity Title

Categorization of patients as "Respiratory Compromise" through objective data regarding comparable degrees of risk and severity.

Opportunity Number

RCI2015-6

Purpose

This announcement invites applications to conduct structured literature review/meta-analysis of various clinical conditions that pose a moderate to high risk for the development of respiratory failure leading to critical illness or death. In particular, the reviews will provide data by which to identify patients who, because of a variety of clinical conditions, are at high and moderate risk of death or respiratory failure-related critical illness. In some cases, the baseline severity of an underlying condition e.g. very severe GOLD Grade IV COPD, can cause a baseline respiratory compromise in a patient. In either case, early identification in the hospital of further deterioration would help guide appropriate interventions. The review will also focus on monitoring and therapeutic interventions that reduce the risk of a downward cascade from respiratory insufficiency to respiratory failure to respiratory arrest.

Important Dates

Posted Date – November 30, 2015

Application Due Dates - January 15, 2016

Clinical Advisory Committee (merit) Review – March 1, 2106

Board of Directors Review – March 2, 2106

Earliest Start Date – April, 2016

Completion Date – Nine months from date of signed Agreement

Application Instructions

Applications should include the following sections: Introduction, Aims, Background, Methods, Analysis, Expected product

Inquiries and submissions related to this request should be sent to

Phillip Porte

Executive Director

Respiratory Compromise Institute

8618 Westwood Center Drive, Suite 210

Vienna, VA 22182

Email submissions and queries are acceptable at phil@respiratorycompromise.org

Phone is 703-496-5357 (eastern time zone, please)

Background

Respiratory compromise is a state in which there is a high likelihood of decompensation into respiratory failure or death, but in which specific interventions (enhanced monitoring or therapies) might prevent or mitigate decompensation.

Respiratory compromise is a major cause of death, morbidity and healthcare expenditure. Among the 100 most frequent discharge diagnoses from a recent Medicare survey (Table 1), there are respiratory illnesses and conditions, 6 of which are in the top 20. Notably, COPD related hospitalizations were the most frequent. The average costs of hospitalizations for respiratory related conditions ranged from approximately $20,000 to $140,000, depending on the severity and presence of complications (Table 2). Early detection of, and early intervention for Respiratory Compromise are unmet needs in public healthcare..

Table 1. Most common respiratory discharge diagnoses

Diagnoses (combined from DRG definitions)	**Frequency rank***
COPD	1
Pulmonary edema / heart failure	8
Respiratory disease requiring mechanical ventilation	11
Poisoning from etoh or other drugs	16
Infectious & parasitic diseases w O.R. procedure	19
Signs & symptoms (nonspecific)	20
Respiratory infection or inflammation	26
Pneumonia and/or pleurisy	29
Chest pain	32
Other vascular procedures	35
Seizures	40
Degenerative nervous system disorders	42
Other circulatory system diagnoses	64
Pulmonary embolism	68
Bronchitis & asthma	76

Data from hospital-specific charges for the more than 3,000 U.S. hospitals that receive Medicare Inpatient Prospective Payment System (IPPS) payments for the top 100 most frequently billed discharges, paid under Medicare based on a rate per discharge using the Medicare Severity Diagnosis Related Group (MS-DRG) for Fiscal Year (FY) 2013. The top 100 diagnoses represent more than 7 million discharges or 60 percent of total Medicare IPPS discharges.

https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Inpatient2013.html

Table 2. Average costs of most common inpatient respiratory conditions

Diagnoses (DRG definition)	Average Covered Charges*
292 - HEART FAILURE & SHOCK W CC	$141,088
291 - HEART FAILURE & SHOCK W MCC	$100,941
194 - SIMPLE PNEUMONIA & PLEURISY W CC	$95,906
190 - CHRONIC OBSTRUCTIVE PULMONARY DISEASE W MCC	$87,901
193 - SIMPLE PNEUMONIA & PLEURISY W MCC	$86,021
191 - CHRONIC OBSTRUCTIVE PULMONARY DISEASE W CC	$77,353
189 - PULMONARY EDEMA & RESPIRATORY FAILURE	$67,224
287 - CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH W/O MCC	$52,718
192 - CHRONIC OBSTRUCTIVE PULMONARY DISEASE W/O CC/MCC	$51,594
313 - CHEST PAIN	$53,556
177 - RESPIRATORY INFECTIONS & INFLAMMATIONS W MCC	$46,065
293 - HEART FAILURE & SHOCK W/O CC/MCC	$47,964
208 - RESPIRATORY SYSTEM DIAGNOSIS W VENTILATOR SUPPORT <96 HOURS	$41,439
195 - SIMPLE PNEUMONIA & PLEURISY W/O CC/MCC	$44,468
853 - INFECTIOUS & PARASITIC DISEASES W O.R. PROCEDURE W MCC	$34,175
178 - RESPIRATORY INFECTIONS & INFLAMMATIONS W CC	$34,392
101 - SEIZURES W/O MCC	$30,711
948 - SIGNS & SYMPTOMS W/O MCC	$32,852
202 - BRONCHITIS & ASTHMA W CC/MCC	$36,215
897 - ALCOHOL/DRUG ABUSE OR DEPENDENCE W/O REHABILITATION THERAPY W/O MCC	$31,462
176 - PULMONARY EMBOLISM W/O MCC	$28,033

918 - POISONING & TOXIC EFFECTS OF DRUGS W/O MCC	$27,274
207 - RESPIRATORY SYSTEM DIAGNOSIS W VENTILATOR SUPPORT 96+ HOURS	$25,025
057 - DEGENERATIVE NERVOUS SYSTEM DISORDERS W/O MCC	$26,214
917 - POISONING & TOXIC EFFECTS OF DRUGS W MCC	$25,466
254 - OTHER VASCULAR PROCEDURES W/O CC/MCC	$19,038
315 - OTHER CIRCULATORY SYSTEM DIAGNOSES W CC	$19,247

During prior discussions, the RCI designated five categories of respiratory compromise, based on pathophysiological similarities: control of breathing (RC_{COB}), parenchymal lung disease (RC_{PLD}), airway resistance (RC_{AR}), hydrostatic pulmonary edema (RC_{HPE}) and right ventricular dysfunction (RC_{RVD}). Despite the large variety of respiratory diseases and related conditions that may lead to respiratory compromise, the mechanism(s) by which compromise occurs or progresses typically falls into one or more of the five designated categories.

Purpose

The purpose of the project is twofold:

1. To generate an evidence-based matrix with which to designate patients with different types of respiratory related illnesses as having respiratory compromise, based on similar risks of deterioration into respiratory failure or death. The risk is influenced by both the **severity** of the condition (e.g. gas exchange in pneumonia) as well as the **threat** of additional complications occurring (e.g. the probability of aspiration during over sedation).
2. Additionally, the matrix should identify both monitoring and therapeutic interventions that have documented success in reducing the risk of, or an earlier identification of the progression of, respiratory compromise. The project will select the most common diseases from each of the five categories and, for each one, develop an evidence-based approach by which a clinician could identify that a particular patient was in respiratory compromise, or progressing with respiratory compromise, and successful monitoring and therapeutic interventions that mitigate the risk of respiratory compromise.

Deliverable product

The project will produce an evidence-supported matrix that will list the characteristics of various respiratory disorders according to the risk of respiratory failure and death. Specifically, the matrix will enhance the ability of clinicians to recognize when a particular condition has a <1%, 1%-5%, >5%–10%, >10%-20%, and >20% probability of resulting in in-hospital mortality or

respiratory failure (defined as respiratory related critical illness requiring invasive mechanical ventilation, vasopressor support, CPR or other ICU interventions).

The matrices will resemble the examples illustrated in table 3. The categories of respiratory compromise will follow the pattern illustrated in the table: control of breathing (RC_{COB}), parenchymal lung disease (RC_{PLD}), airway resistance (RC_{AR}), hydrostatic pulmonary edema (RC_{HPE}) and right ventricular dysfunction (RC_{RVD}). The particular diseases listed under each category will be determined by the results of the review. The inclusion of a particular disease will be justified in terms of its frequency and the strength of the evidence. There will be separate tables for risk of mortality, risk of respiratory failure and the combined variable of risk of mortality or respiratory failure.

The matrices will summarize data from peer-reviewed literature and other reliable sources. The matrices will be accompanied by supportive text with the appropriate references included

Award Project Period

Nine months.

Page Limitations

Applications should be no more than five pages long.

Category of Respiratory Compromise	Findings associated with probabilities of in-hospital mortality				
Condition	<1%	1% - 5%	>5% - 10%	>10% - 20%	> 20%
Control of breathing (RC_{COB})					
Analgesia overdose	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Brainstem stroke	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Swallowing dysfunction	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Parenchymal lung disease (RC_{PLD})					
Community acquired pneumonia	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Aspiration pneumonia	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Acute lung injury	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Airway resistance (RC_{AR})					
Asthma exacerbation	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
COPD exacerbation	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*

Stridor, large airway obstruction	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Hydrostatic pulmonary edema (RC_{HPE})					
Left ventricular infarction	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Chronic heart failure with reduced ejection fraction (HFPEF)	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Chronic heart failure with preserved ejection fraction (HFPEF)	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Right ventricular dysfunction (RC_{RVD})					
Acute pulmonary embolism	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*
Pulmonary arterial hypertension exacerbation	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physical exam, monitoring, lab, imaging and other findings*	*History, physica monitoring, imaging and findings*