

## Guidelines for Preventing Health-Care-Associated Pneumonia, 2003: Buyer Beware!

Nosocomial pneumonia is an important concern for patients, clinicians, health care executives, and third-party payers. The Centers for Disease Control (CDC) published the first CDC guidelines addressing infection control problems in 1981. These guidelines were revised and expanded in 1994 and are an important guide to develop hospital infection control practices.<sup>1</sup> Since the publication of the 1994 CDC guidelines, additional high-level studies, evidence-based reviews, and evidence-based guidelines have been published. With this added evidence there was much anticipation for the revised CDC guidelines recently published<sup>2</sup> and parts of which are reprinted in this issue of *RESPIRATORY CARE*. These revised guidelines have, unfortunately, raised important questions that limit their credibility and applicability. I have serious concerns about these guidelines, related to their methodology, validity, and relevancy, that raise questions regarding their usefulness.

### Methodology

With 433 references the CDC guidelines are clearly reference-based. However, there is no mention of the search strategy that was used or the mechanism whereby references were chosen for inclusion. The categories of recommendations are also curious. There are essentially 2 categories: Category I, which is based on studies, and Category II, which is based on theoretical rationale. There is also a category for unresolved issues. Numerous schemes have been used to grade recommendations in clinical practice guidelines. Moreover, there is no clear consensus that any one grading scheme is superior to the others. However, most grading schemes are based on the strength of the supporting evidence. For example, randomized controlled trials (not mentioned in the CDC grading scheme) result in a stronger recommendation than observational studies. In the CDC scheme ambiguous terms such as "well designed experimental, clinical, or epidemiologic studies" and "certain clinical or epidemiologic studies" are used. Accordingly, the rigor with which the recommendations were graded is suspect.

### Validity

Of greatest concern is the issue of whether the appropriate references were used to support the recommenda-

tions. Throughout the CDC report I am concerned by the numerous places where recommendations are made that were not supported by the references provided. I will give several examples.

The CDC guidelines state, "No recommendation can be made for the preferential use of either HMEs [heat and moisture exchangers] or heated humidifiers to prevent pneumonia in patients receiving mechanically assisted ventilation (unresolved issue)." I agree that this is an unresolved issue. However, what is unresolved is *not* whether pneumonia rates are reduced with the use of these devices. Pneumonia rates are reduced with HME, as shown in a recently published meta-analysis.<sup>3</sup> This is an unresolved issue because of other HME factors, such as their flow resistance, dead space volume, and potential for occlusion. The CDC also recommends that HMEs do not need to be changed more frequently than every 48 hours. I agree with that recommendation; it is supported by the references provided (and others). But given the strength of the evidence that supports that recommendation, it is unclear to me why it received only a Category II recommendation.

When I first read the Guidelines as published in the March 26, 2004, *Mortality and Morbidity Weekly Report*, I was concerned about the recommendation related to small-volume nebulizers.<sup>2</sup> In that document, the CDC recommendation was, "Between treatments on the same patient clean, disinfect, rinse with sterile water (if rinsing is needed), *and* dry small-volume in-line or hand-held medication nebulizers" [italics mine]. It was unclear to me why, without additional evidence, the recommendation was changed from that published in 1994 which stated, "Between treatments on the same patient, disinfect, rinse with sterile water, *or* air-dry small-volume medication nebulizers" [italics mine]. The change in wording from "*or*" to "*and*" changed the meaning of the sentence and implied that nebulizers should be disinfected between treatments. In the United States, small volume medication nebulizers are typically single-patient use disposable devices; they are *not* disinfected and reused. Moreover, the references provided<sup>4-6</sup> did not support the need to disinfect the nebulizer after each treatment. Craven<sup>4</sup> recommended that nebulizers be cleaned with sterile saline solution or distilled water and air dried after each treatment; no recommendation is made to disinfect the nebulizer after each

treatment. Mastro et al<sup>5</sup> recommended that only sterile fluids be used to clean nebulizers—no mention is made of disinfecting the nebulizer between treatments. Reboli et al<sup>6</sup> report an outbreak of respiratory infections related to the use of contaminated albuterol solution. In none of these 3 studies is disinfection of the nebulizer between treatments recommended.

I was therefore pleased to see that the CDC revised the recommendation regarding nebulizer disinfection in the guidelines published in this issue of *RESPIRATORY CARE*. The revised wording, “*Between treatments on the same patient, disinfect, rinse with sterile water, or air-dry small-volume in-line or hand-held medication nebulizers*” [italics mine], essentially restores the wording to that in the 1994 guidelines. I interpret this to mean that rinsing the nebulizer between treatments and allowing it to air dry is an acceptable practice – and one that is consistent with current practice in many hospitals. It is very important for respiratory therapists to be aware of this important change in wording (from that in the March 26, 2004, *MMWR*) and to be knowledgeable in its interpretation. It is also important for respiratory care departments to take a position of leadership in this matter. Otherwise, considerable confusion may occur if the hospital’s infection control department is implementing policy based on the *MMWR* report but the respiratory care department is implementing policy based on the *RESPIRATORY CARE* report. The guidelines in this issue of *RESPIRATORY CARE* supercede those in the March 26, 2004, *MMWR*.

Respiratory care textbooks recommend sterile technique for suctioning the lower respiratory tract (ie, through an endotracheal tube or tracheostomy tube). Thus I was surprised to see the following statement in the CDC recommendations: “No recommendation can be made about wearing sterile rather than clean gloves when performing endotracheal suctioning (Unresolved issue).” Moreover, statements that follow that statement are inconsistent with it. It is recommended that sterile catheters be used and that sterile fluid be used to rinse the catheter between passes of the suction catheter. Why would one *not* use sterile gloves if a sterile catheter is used and other aspects of the procedure use sterile technique? These recommendations are, at the least, inconsistent.

The CDC guidelines state that, “No recommendation can be made about the frequency of routinely changing the in-line suction catheter of a closed-suction system in use on one patient (Unresolved issue).” Although this is given a grade of “unresolved issue,” the reference provided reported *no difference* in ventilator-associated pneumonia rates between once-daily changes and no routine changes.<sup>7</sup> Further, the in-line suction catheter essentially becomes part of the ventilator circuit, and the CDC recommends that ventilator circuits not be changed at regular intervals.

The CDC guidelines appropriately recommend the use of noninvasive ventilation as a method to decrease the risk of ventilator-associated pneumonia. But, interestingly, they categorize this recommendation as Level II. There is considerable high-level evidence for the use of noninvasive ventilation, including several meta-analyses and systematic reviews.<sup>8–11</sup>

It is also of interest that incentive spirometry is recommended for postoperative patients at risk for pneumonia, and the CDC categorized this recommendation as Level IB. The references cited do not provide strong evidence for that recommendation. One of their references did not even assess the use of incentive spirometry (it assessed the use of breathing exercises).<sup>12</sup> Another one of their references (a systematic review and meta-analysis) reported no difference in postoperative complications (after upper abdominal surgery) between incentive spirometry, intermittent positive-pressure breathing, and deep breathing exercises.<sup>13</sup> Another systematic review, not referenced in the CDC report, concluded that “the evidence does not support the use of incentive spirometry for decreasing the incidence of postoperative pulmonary complications following cardiac or upper abdominal surgery.”<sup>14</sup> Correctly, the CDC report makes no recommendation about the routine use of chest physiotherapy on postoperative patients, as the evidence to support that therapy is weak.<sup>15</sup>

### Relevancy

I question the relevancy of some of the recommendations in the CDC Guidelines. The lack of relevancy of some parts of the document unfortunately calls into question the rigor of the recommendations. For example, one of the recommendations in the section related to breathing circuits states, “Use sterile (not distilled, nonsterile) water to fill bubbling humidifiers.” Bubble (ie, cascade) humidifiers are no longer commercially available, and I suspect they are used infrequently. Consistent with the observation that this recommendation is dated, the references supporting the recommendation date from 1971 to 1986. Providing a recommendation for a device that is no longer in use is not helpful. It would be useful to know what we should do with wick humidifiers and passover humidifiers. Moreover, the issue of heated-wire circuits is not addressed.

Inhalers and spacers are increasingly used in both intubated and nonintubated patients. Infection control issues (or lack thereof) related to inhalers are not addressed in the guidelines. This is unfortunate because respiratory therapists lack direction in this regard. For example, is the risk of pneumonia lower if inhalers are used instead of nebulizers?

**How to Address These Concerns?**

What can be done when recommendations that are not credible are made by a credible source? This is a difficult issue. Many will read the guidelines and blindly accept them based on the credibility of the sponsoring organization. Others will disregard the entire document because of some of the deficiencies noted above. I think it is important that we do not throw out the proverbial baby with the bathwater. The deficiencies in the CDC guidelines illustrate the importance of critically assessing published guidelines. The references must be checked against the recommendations. Respiratory therapists, particularly those in leadership positions, need to be fluent in the deficiencies of guideline recommendations so that intelligent recommendations can be made regarding hospital policy.

Fortunately, there are additional sources of evidence-based guidelines related to ventilator-associated pneumonia and the role of the ventilator circuit. I strongly advise respiratory therapists to read the American Association for Respiratory Care guidelines on this topic, recently published in *RESPIRATORY CARE*.<sup>3</sup> There are also good systematic reviews on this topic.<sup>16,17</sup> The benefit of valid evidence-based clinical practice guidelines is that they substantially decrease the effort required by clinicians to arrive at practice decisions. In the absence of such, we must all do the hard work of reviewing the primary evidence and incorporating it into our everyday practice. Publication of guidelines that are not rigorously supported by high-level evidence may unnecessarily increase health care costs and have the potential to validate dangerous practices.

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