TAKE-HOME MESSAGE
Video laryngoscopy provides superior views of the glottic opening compared with direct laryngoscopy but does not improve the overall rate of intubation success. For difficult airways, video laryngoscopy decreases the time required for intubation.

METHODS

DATA SOURCES
PubMed and EMBASE were searched from existence to September 24, 2010, with Medical Subject Headings ("laryngoscopes," "videotape recording," and "intubation") and Emtree terms ("laryngoscope," "videorecording," and "respiratory tract intubation"). The authors searched references of relevant articles to identify additional studies.

STUDY SELECTION
The authors selected randomized trials comparing at least 1 video laryngoscope with direct laryngoscopy in the clinical setting. They excluded mannequin studies and observational studies. Studies were included if any of the 3 selected outcomes were reported: overall intubation success, time to intubation, and quality of the glottic view. Study authors were contacted individually to obtain information not reported in the original articles.

DATA EXTRACTION AND SYNTHESIS
Two authors independently abstracted data from each identified study. The authors also assessed for publication bias and

Does the Use of Video Laryngoscopy Improve Intubation Outcomes?

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Results
Pooled results for video laryngoscopy compared to direct laryngoscopy.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>RR (95% CI)</th>
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<tr>
<td>Overall intubation</td>
<td>1 (0.99 to 1.01)</td>
</tr>
<tr>
<td>Intubation success rate, VL</td>
<td>0.977 (0.99/0.961)</td>
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<tr>
<td>Intubation success rate, DL</td>
<td>0.987 (0.987/0.995)</td>
</tr>
<tr>
<td>Time to intubation, SMD (difficult)</td>
<td>0.26 (-0.27 to 0.78)</td>
</tr>
<tr>
<td>Time to intubation, SMD (VL)</td>
<td>-0.75 (-1.24 to -0.25)</td>
</tr>
</tbody>
</table>

The authors identified 260 articles, of which 11 met inclusion criteria. The studies enrolled a total of 1,196 subjects and used 5 different video laryngoscopes: 5 GlideScope (Vera-thon, Bothell, WA), 3 C-MAC (Karl Storz Corp, Tuttingen, Germany), 1 McGrath (LMA/Teleflex, San Diego, CA), 1 Pentax-AWS (Ambu Inc, Ballerup, Denmark), and 1 X-Lite (Rusch/Teleflex, Research Triangle Park, NC). All studies were performed in the operating room.

The authors reported standard mean difference for time to intubation, intubation success rate ratios, and improvement in glottic view between video and direct laryngoscopy. They also performed subgroup analysis by type of video laryngoscope, experience level of the provider, difficult airway (yes/no), and age group (pediatric/adult). Video laryngoscopy did not affect overall intubation success or time to intubation but did improve the view of the glottic.
opening compared with direct laryngoscopy. However, a subgroup analysis demonstrated decreased time to intubation for difficult airways by any definition. Time to intubation did not differ between video laryngoscopy and direct laryngoscopy when stratified by either patient population or provider experience. All types of video laryngoscopes performed similarly.

Commentary

Intubation is one of the most challenging procedures in emergency medicine and can be associated with serious adverse events such as hypoxia and cardiac arrest. As a result, it is imperative that research continue to advance the field of emergency airway management and new modalities be developed to help improve intubation success. Video laryngoscopy has changed the landscape of airway management in the emergency department (ED), with the introduction of several devices during the last decade.

Although not specific to the ED, the results of this systematic review highlight the advantages that video laryngoscopy offer over direct laryngoscopy, including improved time to intubation and glottic view. These benefits were noted for both experienced and novice providers. For ED patients, observational data have shown both improved glottic exposure and enhanced first-pass success rate compared with that for conventional laryngoscopy among like groups.

Since this meta-analysis was published, additional work has identified that intubation success rates with video laryngoscopes are equal to or better than those with direct laryngoscopy in populations similar to those encountered in the ED, including trauma patients, out-of-hospital patients, and those in the ICU. Though there may be situations in which providers elect to use direct laryngoscopy as a first-line agent (eg, large-volume hematemesis), there are limited data in regard to these unique scenarios, and previous work suggests that video laryngoscopy may be a better first-line device for emergency airway management. Although video laryngoscopy offers several benefits over direct laryngoscopy, including providing the ability to record and review intubation attempts, there does not appear to be a clear advantage of one video laryngoscope over another in ED intubations.
