In the October issue of *JC RS*, the article, “Decreasing rate of capsule complications in cataract surgery,” Lundström et al., evaluates the frequency of capsule complications during cataract surgery over the 8-year period from 2002-09 and identifies risk factors using prospectively collected data from the Swedish National Cataract Register (NCR). Capsular complications occurred in 2.09% of cases. Possible risk factors included poor pre-op corrected visual acuity, glaucoma, diabetic retinopathy, older age, first eye surgery, clinic volume, and clinic location.

We applaud Lundström et al. for the multiple merits of this publication. By using the Swedish NCR as the data source, they were able to perform a true population study, representing more than 97% of the cataract surgery done in the country.

**Decomposing rate of capsule complications in cataract surgery**

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**Eight-year study of incidence, risk factors, and data validity by the Swedish National Cataract Register**

**Purpose:** To define the incidence of capsule complication and its risk factors in Sweden over an 8-year period

**Setting:** Fifty-two ophthalmic surgery units in Sweden

**Design:** Database study

**Methods:** Data were collected prospectively in the Swedish National Cataract Register (NCR). Capsular complications occurred in 2.09% of cases. Possible risk factors included poor pre-op corrected visual acuity, glaucoma, diabetic retinopathy, older age, first eye surgery, clinic volume, and clinic location.

**Results:** The analyses were based on 602,553 cataract extractions reported to the NCR. A capsule complication was reported in 12,574 cataract extractions, corresponding to a frequency of 2.09%. The incidence of this complication consistently decreased each year from 2002 to 2006, after which it stabilized. Poor corrected distance visual acuity in the surgical eye (≤0.1), the occurrence of glaucoma, diabetic retinopathy, and age were among the parameters significantly related to a capsule complication. Some of these parameters also decreased over time. However, even after adjusting for this, there was an obvious decrease in capsule complications over time. The validity test showed a certain underreporting of capsule complications to the registry, but it was not significant and did not change over time.

**Conclusion:** The incidence of capsule complications decreased over time. This may be partly the result of fewer risk factors and of better surgical quality.
during the study period. In addition, in an attempt to ensure the validity of the reported complication rate, the authors investigated the possibility of underreporting, recognizing a limitation to any self-reported outcome study. By capturing a large, representative sample and performing additional analysis to validate the data, the authors attempt to provide a sense of the true complication rate so as to minimize the bias of underreporting.

The study confirms previously recognized risk factors for capsule complications, such as poor pre-op corrected visual acuity, diabetic retinopathy, and glaucoma. It also identifies new potential risk factors, such as first eye surgery, and suggests that increasing age, which has been associated in some but not all studies with worse outcomes, is in fact a risk factor. Identifying such risks may allow pre- or intraoperative adjustments to be made in an attempt to prevent complications or at least permit a more thorough informed consent process.

However, there are limitations to the study as well. First, in their validation sample, the authors found an underreporting rate of 32%, which was evenly distributed across the study years analyzed (2002-2006). This underreporting rate can be used to adjust the capsule complication rate for the population as a whole, but it is difficult to know how it factors into the evaluation of trends and risk factors. Underreporting, although shown to be distributed evenly across time, may differ within important variables such as clinic volume, university setting, or other unmeasured confounders. For example, if a disproportionate amount of underreporting came from high volume centers, then the association between high volume centers and lower risks of complications may be spurious. We also feel that the validation could have been strengthened by including the time frame from 2007 to 2009, particularly because the logistic regression analysis for the entirety of the data includes those years. Disproportionate underreporting from those years may significantly alter the overall trends and conclusions.

There are also a number of limitations to the specific inferences that can be drawn from the data, which the authors acknowledge. Based on the data, the authors conclude that the capsule complication rate has been decreasing over time. While their data do suggest this trend, there is no way to prove that the decreased rate is due to any of the hypothesized factors, including increased surgical experience for specific surgeons. From the data provided, it is impossible to know whether the findings reflect greater experience on the part of individual surgeons performing more surgeries, improved surgical techniques, technical refinements in equipment, or some combination of these factors. The authors also propose that the complication rate has decreased over time as a result of operating on younger and presumably healthier eyes. Again, however, there are no data to support the assumption that younger patients have healthier eyes, particularly given changing population demographic risk factors over time such as the increasing prevalence of diabetes in younger patients. Furthermore, while the mean age in patients undergoing surgery decreased by 1.29 years over the course of the study, the clinical significance of this finding is unclear.

From our perspective, one of the most intriguing findings is the association between high volume centers and lower complication rates (Figure 1). It would have been interesting to include this variable (center volume) in the multivariate analysis, especially as the authors note a trend of more centers performing higher volume surgery over time. Is it therefore possible that the decreased rate of complications over time is due to more surgeries being done at high volume centers? It is well recognized in a number of surgical subspecialties that negative outcomes and center volume are inversely related, due to a variety of reasons, such as more experienced staff and surgeons, better equipment, etc. We hope that the authors continue to explore this finding in future analyses.

Finally, this study raises additional interesting findings regarding the difference in complication rate between university and non-university clinics, which provokes several questions. Do trainees have more complications? Are trainees less likely to underreport? Are university clinics high volume or low volume? In teaching future generations of surgeons, it would be important to know if in fact this difference is real and if so, whether it is a result of the training aspect of university clinics. Though the authors report that they controlled for ocular comorbidity when comparing university and non-university clinics, none of this analysis was presented, which limits our ability to evaluate the conclusions.

In summary, this article gives valuable insight into capsule complications in a large population. It reviews well the risk factors for capsular complications during cataract surgery and adds to the body of literature describing previously known risk factors. This study also highlights the NCR as a powerful tool for answering interesting and important clinical questions. If more such national health registries existed and were able to combine prospective data as Sweden has done for the last decade, we would be able to even more robustly address some of the compelling questions that the authors have raised.