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Automated Public Health Reporting: A Familiar but Cantankerous Friend

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The Electronic medical record Support for Public health (ESP) project by Klompas et al. (1) promises improved public health reporting by exploiting information captured in electronic health records. This project pulls together a number of technologies—health records, terminology maintenance, inference rules, data and transmission standards, security, text processing, and user interfaces—to create a comprehensive reporting system with a public health query feature. The initial deployment at Harvard Vanguard Medical Associates is promising.

A related system may offer some lessons for the new project. The Applied Informatics Project (2) received funding in 1994 from the US Department of Commerce in order to address tuberculosis care using information technology in New York City. One of the components was a system for automated notification to the New York City Department of Health and Mental Hygiene not only of all cases of active tuberculosis (3) but also of all reportable microbiology findings. This system used the Health Level Seven data standard, a controlled terminology, and data encryption for the transfer. It used sophisticated automated inference rules including natural language processing to detect active tuberculosis from the electronic health record (4) and used the result not only for public health reporting but also to reduce the respiratory isolation error rate by almost one half (5). It demonstrated that terminology maintenance is a critical problem, with one error leading to 93 false positive tuberculosis reports (6); an automated monitoring system was added to reduce such errors. It was an exciting system and it proved the concept, but it was never disseminated beyond the original medical center. Most other local centers lacked the health information technology to carry it out, and none had a strong incentive to make it work. Some components are still in operation today, such as respiratory isolation reminders, but laboratory reporting has been subsumed by the Electronic Clinical Laboratory Reporting System (7). Nevertheless, the project showed that electronic health records have something to offer, that health data standards are essential, that the same technology can benefit both public health and clinical care, and that generalization is difficult.

Automated laboratory reporting systems also offer some lessons for the new project. Studies of their capabilities have demonstrated improved completeness and timeliness (8, 9, 10), but studies of such systems in mature operation have also identified a number of challenges: certification, the need for clinician input, coordinating multiple reports over location and time, and terminology maintenance (7). The use of electronic health record data is likely to increase the challenges.

A defining aspect of ESP is that it is coupled with an electronic health record, but not incorporated into it. This allows the software to be reused with different types of electronic health records and it avoids interference with clinical operations, but it also loses the ability to use the same technology for both public health and for clinical care. For example, case detection rules would have to be defined both in ESP and in the electronic health record to alert the health

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department and simultaneously alert the clinician within the normal workflow of that clinician (e.g., couple case detection using electronic order entry).

More important is the effect of its design on dissemination. The ESP team chose its initial clinical environment wisely. Harvard Vanguard Medical Associates provides electronic health record support for many practitioners with centralized information technology services. The ESP maintenance burden, including maintenance of the terminology, detection rules, and messaging format, is distributed among many practitioners. Although the system is designed to be coupled with electronic health records for small practices, it is unlikely that they could handle the installation and maintenance burden.

The design minimizes the duplicate work of recreating the reporting software, but in the case of widespread deployment, it may be worth having several versions if it reduces the local installation and maintenance for practitioners. For example, vendors may need to include a reporting component in their electronic health record products for widespread dissemination to occur.

An alternative is to move the reporting software outside the practice to community health information exchange projects. As Klompas et al. point out, this raises privacy issues, but if the issues can be addressed, it would piggyback public health reporting on other data exchange efforts and share the maintenance burden. Such work is in progress (10, 11), and the ESP team plans to move in a similar direction in Massachusetts (1).

Another issue relates to possible unintended consequences of automated reporting. For example, pelvic inflammatory disease reporting may be low not due to a lack of technology, but because of sensitivity by the practitioner about the possible consequences for the patient. Reporting systems must be deployed with sensitivity to such issues to avoid driving patients away from healthcare.

Electronic health records may prove to be a boon to public health reporting, and ESP is a great step forward; significant challenges remain, however. Generalization is likely to be difficult without proper incentives and data standards, hence rigorous evaluation (12) remains to be done.

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