Articles were classified on the basis of whether they addressed a medical practice, whether that practice that was new or already in place, and whether the studies’ results were positive or negative. Two reviewers independently classified these articles (V.P. and V.G.). This yielded a highly similar profile (weighted Cohen $\kappa=0.94$). Where there was disagreement, a third reviewer (A.C.) adjudicated those discrepancies. Next, we studied the precondition(s) that permitted reversal in each case. Two reviewers independently articulated the precondition (V.P. and A.C.), and these results were combined. This again yielded a highly similar profile (weighted Cohen $\kappa=0.85$).

Results. There were 212 original articles published in the New England Journal of Medicine in 2009, 124 (58%) of which made some claim with respect to a medical practice. The remainder was predominantly descriptive, molecular science publications. Of these 124 articles, 89 (72%) investigated a new medical practice, while 35 (28%) studied a practice already in adoption; 91 (73%) were randomized controlled trials; 19 (15%) were prospective cohort studies; 13 (10%) were retrospective cohort; and 1 was a case-control study. Of the 124 studies, 82 (66%) reported positive results and 42 (33%) reported negative findings; 61 (49%) reported a new practice surpassing current care; 12 (10%) reported a new practice failing to improve on current practice; 16 (13%) reported an existing practice that was upheld as beneficial and 16 (13%) constituted reversal; and 19 (15%) were classified as inconclusive.

The eFigure (http://www.archinternmed.com) details all 16 reversals that appeared in 2009, and how each article contradicted current medical practice. Reversals included medical therapies (prednisone use among preschool-aged children with viral wheezing, tight glycemic control in intensive care unit patients, and the routine use of statins in hemodialysis patients), invasive procedures (endoscopic vein harvesting for coronary artery bypass graft surgery and percutaneous coronary intervention for chronic total artery occlusions and ath erosclerotic renal artery disease), and screening tests. In several cases, current guidelines were contradicted by the study in question, as indicated in the third column of the eFigure.

The Figure is an attempt to identify the underlying reason that permitted reversal. Confidence in physiologic models as the prime reason to adopt a practice initially was the most common precondition for reversal.

Comment. The reversal of medical practice is not uncommon in high-impact literature: 13% of articles that make a claim about a medical practice constituted reversals. The reversal of medical practice is not uncommon in high-impact literature: 13% of articles that make a claim about a medical practice constituted reversals. The range of reversals we encountered is broad and encompasses many arenas of medical practice including screening tests and all types of therapeutics.

One may argue that not all the cases we examined are truly reversals. Newer studies, though generally more robust than their predecessors, may not necessarily be correct. However, on average, better-controlled and better-powered studies do provide stronger truth claims. Given the quality of studies published in the New England Journal of Medicine, we believe that the results reported are more likely to be enduring. The reversal of medical practice is an important subject with far-reaching consequences. Further study is necessary and of profound importance.

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Author Contributions: Dr Prasad had full access to the data and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Prasad and Cifu. Acquisition of data: Prasad and Gall. Analysis and interpretation of data: Prasad, Gall, and Cifu. Drafting of the manuscript: Prasad. Critical revision of the manuscript for important intellectual content: Prasad, Gall, and Cifu. Statistical analysis: Prasad. Administrative, technical, and material support: Gall. Study supervision: Cifu.

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Online-Only Material: The eFigure and eReferences are available at http://www.archinternmed.com.


Deaths Involving Drugs in Vermont, 2004 Through 2010

In 2009, the National Center for Health Statistics at the Centers for Disease Control and Prevention identified Vermont as having one of the highest rates of death due to overdoses (both accidental and suicide) involving opioid analgesics based on 1 year of data (2006).1 Given this disconcerting finding, we sought to examine deaths involving opioid analgesics over time to obtain a clearer picture of the problem.
Methods. In Vermont, the Medical Examiner’s Office has statutory authority to investigate deaths when a person dies from violence; suddenly (when in apparent good health); unattended by a physician or a recognized practitioner of a well-established church; by casualty; by suicide; as a result of injury; in jail or prison or in a mental institution; in any unusual, unnatural, or suspicious manner; or in circumstances involving a hazard to public health, welfare, or safety.2

The medical examiner (S.L.S.) provided the 2 analysts (E.M.E. and J.S.S.) with information on all deaths from 2004 through 2010, in which a drug, legal or illegal, contributed to the death. The analysts separately reviewed and coded each death as involving prescription opiates (alone or in combination with other drugs) or other drugs. In doing so, the analysts discovered a number of the “other” deaths were due to anticoagulants, which were then coded separately. Deaths due to other drugs included prescribed drugs such as antidepressants or antihypertensives and illegal drugs (eg, cocaine). We did not make a distinction between suicide, natural, or accidental death.

Results. From 2006 through 2009, the number of deaths involving drugs in Vermont increased from 73 to 93 (Table). From 2009 through 2010, the total number of deaths involving drugs decreased by 16% to 78.

We found that the percentage of drug deaths due to prescription opiates peaked in 2006 at 70% and the number of deaths peaked in 2007 at 56. This number declined 29% to 40 in 2010, approximately half of all drug deaths in that year.

The number of deaths seen by the medical examiner involving anticoagulants increased from 4 in 2006 to 18 in 2010, or 23% of all drug deaths. Most deaths involving anticoagulants were due to falls from a standing height and occurred among the elderly (mean age of death in 2010, 82 years). We do not know if individuals who were taking anticoagulants were within the therapeutic international normalized ratio (INR) or if these individuals should have been using lower doses. We also do not know if individuals taking anticoagulants were indicated for these therapies. Because the deaths in this analysis include only those that involved the medical examiner, similar deaths among individuals on anticoagulation therapy likely are underreported.

Table. Deaths Due to Prescription Opiates, Anticoagulants, and Other Drugs per Testing by the Vermont Medical Examiner’s Office, 2004 Through 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Prescription Opiates</th>
<th>Anticoagulants</th>
<th>Other Drugs</th>
<th>Total No. of Deaths Due to Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>23 (35)</td>
<td>9 (14)</td>
<td>33 (51)</td>
<td>65</td>
</tr>
<tr>
<td>2005</td>
<td>48 (58)</td>
<td>9 (11)</td>
<td>26 (31)</td>
<td>83</td>
</tr>
<tr>
<td>2006</td>
<td>51 (70)</td>
<td>3 (4)</td>
<td>19 (26)</td>
<td>73</td>
</tr>
<tr>
<td>2007</td>
<td>56 (69)</td>
<td>6 (7)</td>
<td>19 (24)</td>
<td>81</td>
</tr>
<tr>
<td>2008</td>
<td>51 (60)</td>
<td>16 (19)</td>
<td>21 (28)</td>
<td>85</td>
</tr>
<tr>
<td>2009</td>
<td>49 (53)</td>
<td>18 (19)</td>
<td>26 (28)</td>
<td>93</td>
</tr>
<tr>
<td>2010</td>
<td>40 (51)</td>
<td>18 (23)</td>
<td>23 (30)</td>
<td>78</td>
</tr>
</tbody>
</table>

Comment. In 2006, the Vermont legislature established the Vermont Prescription Monitoring System (VPMS), a Web-based tool that collects information from all claims for scheduled II-IV prescriptions dispensed by all licensed in-state and out-of-state retail and mail-order pharmacies. Prescribers and dispensers started using the system to access the controlled prescription histories of their current patients in May 2009, with data retroactive to July 1, 2008. More than 1300 prescribers and pharmacists registered to use the system as of May 2011. Use of the VPMS by health professionals, combined with heightened awareness of prescription drug misuse in the general public, may have contributed to the decline in deaths involving prescription opiates.

The increasing rate of unintentional overdose deaths, with a particular focus on prescription opioids, is an area of significant current research3-5 and policy6 interest. However, our experience indicates that the manner of death, cause of injury, and drug involved in each death requires close examination over multiple years. We set out to investigate deaths involving prescription opioids and in doing so uncovered another problem involving deaths due to anticoagulants—less sensational, perhaps, but no less important.

These data suggest that physicians should carefully monitor the indicated uses of anticoagulants and the INRs of their patients receiving such therapy. Furthermore, to address underreporting of deaths involving anticoagulants, physicians should consider listing anticoagulation therapy as a contributory cause of death in those deaths in which hemorrhage was a terminal mechanism (eg, hemorrhagic stroke), even with therapeutic INR. Because individuals using anticoagulants bleed more than individuals who are not, regardless of the therapeutic INR, the Vermont medical examiner adds anticoagulation as a contributory cause of death. Improving reporting would help us understand the scope of the problem.

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Author Contributions: All authors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Searles. Acquisition of data: Searles. Analysis and interpretation of data: Edwards and Searles. Drafting of the manuscript: Edwards. Critical revision of the manuscript for important intellectual content: Searles and Shapiro. Statistical analysis: Edwards.

Financial Disclosure: None reported.

2. V.S.A. §5205. Death certificate when no attending physician; autopsy.
3. Searles and Shapiro.

The RAD-HOME Project: A Pilot Study of Home Delivery of Radiology Services

For decades, acute medical care has been delivered in a hospital. However, among frail elderly patients, hospitalization often results in delirium, nosocomial infections, pressure sores, and falls. Appropriate home care has been shown to decrease hospitalization and nursing home use without compromising medical outcomes. In addition, providing traditional hospital-based care in the familiar surroundings of a patient’s home might have the advantage of reducing the incidence of iatrogenic illness.

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The delivery of medical services at home has been greatly facilitated by recent advances in technology and communications. In this randomized controlled pilot study, we explored the quality of imaging and clinical outcomes of using mobile, light-weight x-ray equipment to provide radiologic examinations to frail elderly patients at home.

Methods. We conducted a randomized controlled trial among patients in the Hospital Service (HHS) of San Giovanni Battista Hospital of Torino, Italy. Eligible participants were immobilized or chair bound, acutely ill, at intermediate or high risk of delirium according to the criteria of Inouye, and in need of a radiological examination of the chest, pelvis, hips, joints, upper or lower limbs, hands, or feet. Patients were excluded if they had delirium according to the Confusion Assessment Method, were in need of urgent examination (within 24 hours), or needed x-ray examinations not suitable at home. The study protocol was approved by the ethics committee of HHS, and all participants provided informed consent.

At baseline, all patients underwent assessment for eligibility, demographics, health status, depression, mental status, and comorbidities and an evaluation for delirium using the Confusion Assessment Method. Evaluation for delirium was repeated after the radiological examination. Whenever an episode of delirium occurred, the Delirium Rating Scale was completed. Patient satisfaction with home radiography was evaluated after the radiological examination.

Participants were randomly assigned to have radiological imaging performed at home or to have the imaging performed in the hospital. Outcomes were the feasibility and quality of radiological imaging at home, the incidence of delirium after the x-ray examination, and patient satisfaction.

Radiological examinations at home were performed by qualified radiology technicians using a light-weight, portable, high-frequency x-ray tube, improved cassettes (with imaging plate inside), and a mobile radiological station (Computed Radiography POC 260; Carestream Health, Rochester, New York) with remote visualization and real-time processing of acquired images. The equipment, transported in a small van, was in conformity with all applicable laws and the radiation safety standards of the relevant national and international organizations. The operators position themselves and the equipment to prevent anyone, except the patient, from entering the controlled area during x-ray exposure. If it is necessary to stand within the controlled area, the operators wear protective clothing.

Using the Picture Archive and Communication System, the radiology technicians directly transmitted the images acquired at home via wireless broadband Internet to the radiologists in the hospital who read radiographs in real time. Radiologists who read the examinations were blinded to the origin of the studies.

Evaluation of the quality of the images was conducted on chest x-rays of patients who performed this examination in the emergency department and repeated the radiography at home as a control.

The image quality was independently assessed by a group of 7 fully qualified clinical radiologists blinded to the origin of the radiographs. Radiologists used the European Guidelines on Quality criteria, modified for spine radiographs, to intrindividually compare the quality of chest images. The following criteria were rated: symmetrical reproduction of the thorax; reproduction of the whole rib cage above the diaphragm; visually sharp reproduction of vascular pattern in the whole lung, trachea and proximal bronchi, borders of the heart and aorta, diaphragm, and lateral costophrenic angles; visualization of retrocardiac lung, mediastinum, and spine through the heart shadow; and small round details in the whole lung, including the retrocardiac area.

Results. Of the 463 patients admitted to the HHS between June 2008 and June 2009, 123 were eligible and 69 (55%) were enrolled and randomly assigned to radiography performed at home (n = 34) or in the hospital (n = 35).

At baseline, the 2 study groups were similar in all sociodemographic and clinical characteristics (Table). The mean age of the participants was 78 years and 45% were male. Most radiographs were performed for suspected ex-