Strict Liability for Unreasonable Harm: An Aggregative Medical Malpractice Regime

Omer Pelled[[1]](#footnote-2)\*

Large medical facilities are involved in many adverse events, even when taking reasonable care. Under prevailing law, these institutions are liable only for the harm they caused in failing to take reasonable care, so to place liability, courts must inspect every incident and determine if the patient received negligent care and, if so, whether the negligent conduct was the but-for cause of the injury. It is often easier, however, to determine if medical facilities negligently caused unreasonable harm to some (unknown) victims, based on outcomes, than to examine their conduct in each incident. For example, if the court determines that it is reasonable that 100 patients contract an infection during hospitalization, it can surmise that when 150 patients contracted an infection, the hospital, or its employees, negligently caused harm to 50 patients. In light of this informational advantage, the Article examines a liability regime that depends solely on outcomes, similar to a strict liability regime. However, it requires the injurer to pay only for harm that could have been reasonably avoided, similar to a negligence regime. The Article shows that, when applied to medical facilities, the proposed regime increases the chances that negligent hospitals will compensate victims while significantly decreasing the direct and indirect costs of inspecting suspected malpractice cases individually. Last, the Article shows that strict liability for unreasonable harm can also be applied to other tortfeasors, such as polluters and product manufacturers, and that it offers significant advantages when applied to manufacturers of A.I. devices.

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# Introduction

Negligence law holds injurers accountable only if they fail to conform to the standard of care and their victims can establish that this conduct caused them harm. According to legal economists, this structure of negligence law is designed to induce injurers to optimally invest in care since when they fail to take reasonable care, injurers are threatened by the expected harm from their actions.[[2]](#footnote-3)

This emphasis on the injurer’s conduct is built around the notion that potential injurers are rarely involved in an accident, even when they are negligent. For example, while reckless driving increases the risk of road accidents, most reckless drivers will arrive at their destination without an incident.[[3]](#footnote-4) In these paradigmatic cases, the outcome of the behavior – the occurrence of an accident – provides little information about the injurer’s conduct.

Some injurers are routinely involved in many adverse events, even when taking adequate care. For these injurers, the harm they cause over time offers valuable information about their conduct. This information might be especially important in cases where determining the injurer’s conduct in each incident requires a costly inquiry. Consider the following example.

Example 1. *Hospital-acquired infection*. Alex was admitted to the hospital, suffering from a spine injury, which required a simple surgery and short hospitalization. Other than the spine injury, Alex was generally healthy. During hospitalization, Alex developed an infection, which caused permanent harm. Should Alex be compensated for the harm?[[4]](#footnote-5)

The situation portrayed in Example 1 is very common and often preventable.[[5]](#footnote-6) Medical staff can take simple measures - such as washing hands before approaching the patient’s bed or removing ties and bracelets - to reduce the risk of infections.[[6]](#footnote-7)

Prevailing tort law is supposed to offer a remedy to any patient who contracted an infection because the medical staff failed to take one of these simple measures. Since the cost of these preventative measures is much lower than the risk they prevent, failing to take them is considered negligent.[[7]](#footnote-8) Even so, most patients suffering from a hospital-acquired infection will not try to sue their physician or medical facility for medical malpractice, and if they do, they will likely lose.

Consider, for example, the case of *Gahm v. Thomas Jefferson Univ. Hosp.*,on which Example 1 is based.[[8]](#footnote-9)Mr. Gahm underwent back surgery. During recovery he developed a severe infection, resulting in two months of hospitalization and long-lasting harm to his body. Gahm presented expert reports from several physicians, stating that since he developed a hospital-acquired infection, it stands to reason that the hospital breached its duty to maintain safe and adequate facilities. The court granted the hospital’s motion to dismiss, stating, “*There is no basis for finding that the hospital deviated from an appropriate standard of care … or that the hospital’s services, or lack of them, increased the chances of plaintiff’s infection*.”[[9]](#footnote-10) The problems Gahm faced with proving his case are shared by most patients in a similar position.

First, claiming that the staff failed to adopt reasonable measures to ameliorate the risk of infection may be challenging. Infections are common whenever sick people are housed together in close proximity, regardless of efforts to prevent them.[[10]](#footnote-11) Evidence regarding preventative measures in each case might be difficult to obtain and later present in court. For instance, washing hands before approaching the patient may be the standard of care,[[11]](#footnote-12) but the plaintiff is unlikely to know if nurses or physicians failed to wash their hands when caring for other patients and is even less likely to have evidence regarding their hand-washing practices.[[12]](#footnote-13) Furthermore, even if the plaintiff can show staff members failed to take infection-preventing measures, causation still creates a significant barrier to compensation. The plaintiff must show that the harm would have been avoided if the medical staff had taken appropriate measures. However, the risk of contracting an infection is substantial even under optimal conditions, limiting the plaintiff’s ability to prove that the negligent conduct was the but-for cause of the harm.[[13]](#footnote-14)

This Article proposes a new liability regime, according to which injurers, such as hospitals, that are involved in numerous accidents will be liable for the harm they caused in excess of the harm they would have caused if they (consistently) conformed with the standard of reasonable care. This liability regime shifts the focus from the injurer’s conduct in each incident to the outcome of their behavior over time. A regime that places liability on this excessive harm does not require an inquiry into the injurer’s conduct in each incident, much like a strict liability regime. Instead, liability will be set equal to the entire harm, discounted by a fixed sum equal to the expected harm to patients given reasonable care. Under this suggested regime, the injurer is liable only for the harm that could have been reasonably prevented, similar to a negligence regime. Hence, we refer to it as strict liability for unreasonable harm (hereinafter *SLUH)*.

For example, assume that 150 patients contracted a hospital-acquired infections in a given month. Applying SLUH requires the court to decide if, and by how much, this harm exceeded the number of infections that would have occurred if the hospital took reasonable infection-preventative measures. By using data on the risk of infections from randomized-control studies and from other hospitals, the court can determine the reasonable level of harm (e.g., given the number of patients admitted to the hospital, only 100 patients should have contracted an infection assuming the hospital adopted reasonable practices).[[14]](#footnote-15) Under SLUH, the court should hold the hospital liable for the harm of 50 patients, without examining the risk-reducing practices of the hospital’s personnel in each incident.[[15]](#footnote-16)

SLUH follows the same structure as scientific inquiry into conduct and causation. Indeed, in a case of Hospital-acquired infection, no scientist should be comfortable stating with any conviction that a particular patient would have fared better if he or she had received different care.[[16]](#footnote-17) However, it is possible to ascertain, to some level of conviction, that more patients generally contracted infections than they would have under reasonable care.[[17]](#footnote-18)

The use of SLUH as an alternative to the current liability regime for medical facilities solves many, if not most, of the shortcomings plaguing the current system. As hospitals’ liability under SLUH is not dependent on the availability of evidence regarding conduct, hospitals and their employees will have no incentive to adopt defensive practices or hide information about errors to reduce liability risk. It is likely to save hospitals and patients resources since applying this regime costs much less per incident than the current regime.

The analysis of SLUH as an alternative to the current medical malpractice law is not merely a theoretical exercise. Several medical associations, such as the American Heart Association and the American College of Surgeons, have used similar systems to detect avoidable risks and make recommendations to hospitals about how to manage them.[[18]](#footnote-19) By collecting information from various hospitals and studies about patient’s characteristics, ailments, treatments and outcomes these organizations can assess how many patients should suffer from complications if the hospital treats all patients adequately, and by comparing the anticipated level of each complication to a hospital’s outcomes they deduce which risk reducing practices are currently under practiced in the hospital. The SLUH regime utilizes similar data to also assign liability.

The Article continues as follows. Part 2 describes several shortcomings of the current medical malpractice law. Tort liability might encourage physicians to adopt defensive practices, such as performing unnecessary tests and procedures to reduce liability risk, and discourage hospitals from mitigating the risks of future errors following an incident. In addition, the administrative costs of the medical malpractice regime are very high relative to the damages paid out to victims. Last, since negligence is difficult and expensive to prove, only a tiny fraction of patients with a valid claim are ever compensated, resulting in underdeterrence.

Part 3 considers the application of SLUH to medical facilities. It shows that when a medical facility treats a sufficient number of patients, applying SLUH reduces the incentives to practice defensive medicine and increases enforcement without adding administrative costs. It also shows how courts can deal with the risk of error. Last, it shows how current data regarding various complication risks in medical care can be utilized for implementing SLUH.

Part 4 considers the objections and limitations of SLUH compared to other alternatives. One objection is that victims of medical malpractice are unidentified and undercompensated under SLUH. As this Part explains, while the criticism is valid, SLUH should be compared to the ‘law in action’ and not to the ideal application of the current medical malpractice law. Under the current liability regime, most victims of negligent treatment receive no compensation, and compensation is limited for the rest due to the legal procedure’s high administrative costs. Another objection to SLUH is that it encourages medical centers to adopt short-term safety practices while discouraging long-term investments. This section shows that SLUH could be adjusted as to not discourage long-term investments in care. The last objection is that other alternatives to the current medical malpractice law might be superior to SLUH. These alternatives are also considered.

Part 5 suggests other possible areas where SLUH can be used. It shows that SLUH is warranted whenever three conditions are met - the total harm across cases is verifiable; it is possible to determine the reasonable harm for the injurer across time; and the injurer causes enough harm to justify a statistical inference. Typical injurers that fall under these conditions include, for example, product manufacturers, car fleets, and polluters. Applied to these types of injurers, SLUH can create superior incentives for care and activity levels than negligence or strict liability. It further shows that SLUH might be especially beneficial when applied to Artificial-Intelligence (A.I.) devices since these devices might reduce the rate of accidents, but the accidents they are involved in are of a type that reasonable humans would have avoided.

Part 6 concludes the discussion.

# The Challenges of a Negligence Regime

The example that opened this Article illustrates a case of hospital-acquired infection. Unfortunately, infections in hospitals are common and very often preventable.[[19]](#footnote-20) Every year one of every twenty hospitalized patients contracts an infection, resulting in around 100,000 deaths annually.[[20]](#footnote-21) Medical errors, including adverse drug events,[[21]](#footnote-22) diagnostic errors,[[22]](#footnote-23) wrong-site surgery,[[23]](#footnote-24) and foreign objects left inside the patient during surgery,[[24]](#footnote-25) contribute to approximately 100,000 more preventable annual deaths.

Theoretically, negligence law should encourage hospitals to reduce the risk of accidents to the optimal level, and when they fail to do so – compensate the victim. If hospitals know, for example, that they will bear liability whenever they fail to take cost-justified precautions, they will take adequate care. [[25]](#footnote-26) However, the current medical malpractice system does not promote efficiency or safety. While the U.S. leads in health expenditure compared to other OECD countries,[[26]](#footnote-27) it has a high yearly rate of treatable mortality cases, relative to other countries.[[27]](#footnote-28) Patient safety might be in an even worse state. Preventable medical error is estimated to be the third leading cause of death in the U.S.[[28]](#footnote-29) The current system also fails to adequately compensate victims, with the vast majority of victims receiving either a partial or no compensation for their injuries.[[29]](#footnote-30)

The connections between medical malpractice liability and the costs and safety of medical care are complex, involving several effects simultaneously. First, the current legal regime affects the incentives of physicians and hospital to invest in risk-reducing practices, in several ways, for example prioritizing health risks that might trigger litigation over others that are seldom followed by a law suit. Second, the current system requires extensive evidence, making it extremely expensive to operate. Last, since winning a medical malpractice claim is expensive and difficult, few victims of medical malpractice sue, and even less receive full compensation.[[30]](#footnote-31)

There is an extensive empirical debate over the severity of these problems, and this article is not the place to resolve them.[[31]](#footnote-32) This part instead analyzes the main shortcomings of the current medical system, namely how it distorts incentives, creates substantial implementation costs and undercompensated victims of negligent care. The following part will then show how SLUH can be applied to medical facilities and how adopting SLUH reduces incentives for defensive medicine, encourages better safety practices, offers higher compensation to victims, and reduces administrative costs (per incident).

## Distorted Incentives

Negligence law encourages injurers to take reasonable care if courts can accurately define the standard of care and know what care measures were taken. When the evidence of the standard of care or the conduct are murky, healthcare providers might prefer measures that reduce liability over measures that reduce actual risk to the patient. There are three typical ways in which negligence regime can create such a distortion – encouraging the hospital to reduce risks that might trigger a law suit and ignore other risks that are less often the focus of litigation; perform tests and procedures that produce evidence of reasonable care, even when they are not medically justified; and discourage physicians and from performing actions that are beneficial for patient but may be used as evidence of negligence.

### 2.1.1 Prioritizing Measures that are Part of the Negligence Inquiry

For negligence law to deter injurers adequately, courts need to define a clear standard of care, accounting for all risk-reducing measures and their relative costs and benefits. This procedure requires another choice about the level of abstraction courts use to determine fault.

Consider the following example.

Example 2. *foreign object*. *Masha underwent stomach surgery. During the procedure, the surgeon used several sponges. Two nurses in the operating room independently counted every sponge used and counted the sponges again at the end of the surgery. Both nurses miscounted the sponges, and one was left inside Masha’s stomach and caused her harm.[[32]](#footnote-33)*

When courts examine such a case, they might consider the actions of the surgeon, and deem negligent any surgeon who forgets a sponge inside the patient during surgery, considering that it is obviously the standard practice to remove any sponge that is used during the procedure. However, these accidents are usually caused by lapses in attention, [[33]](#footnote-34) and some lapses are inevitable, meaning reducing them to zero is impossible. Taking into account that some errors are inevitable, we might broaden the scope of the negligence inquiry, moving away from the particular conduct (leaving the sponge), and base the standard of care on the measures the surgeon takes to reduce the risk of errors, such as counting the sponges during the surgery.[[34]](#footnote-35) Basing liability on practices designed to reduce errors means that the surgeon is considered negligent if there are untaken precautions that could have reduced the risk of harm to the patient more than they would have cost.[[35]](#footnote-36) In example 2, the surgical team included two nurses tasked with reducing the risk of leaving a foreign object behind during surgery. It might be the case that placing a third nurse in the room and asking him or her to triple-check the number of sponges used at the start and end of every surgery could reduce the risk even further. However, that does not mean that adding this precaution is warranted. The costs of hiring a third nurse might outweigh the benefit of doing so. Even if having a third nurse is justified, we can further ask about the fourth, the fifth, and so forth. It is clear that at some point, which we label as the standard of care,[[36]](#footnote-37) further precautions are unjustified, even though some medical errors will still occur.

However, looking only into error-reducing precautions might still miss parts of the picture. Some factors contributing to the risk of medical error are out of the physician’s control, but can be mitigated by the hospital.For example, high patient-load increases the risk of error in a hospital setting.[[37]](#footnote-38) If the physician must treat several patients, any time added to the treatment of one patient reduces the risk of error for that patient but increases the risk others. Sleep deprivation is another factor that aggravates the risk of error, which might be out of the surgeon’s control. Medical residents, for example, often work 80 hours per week, limiting their free time and ability to rest properly.[[38]](#footnote-39) Hospitals can alleviate the risk of medical errors due to workload and sleep deprivation by hiring additional staff. Thus, we can further abstract the negligence inquiry from the treating physician and investigate the hospital’s investment in personnel, and other error-reducing investments.[[39]](#footnote-40)

The shift from focusing on the conduct of a particular doctor or nurse to the precaution measures taken by the hospital was promoted by proposals to adopt “hospital enterprise liability” as a way to repair the problem of current medical malpractice law. Enterprise liability places sole responsibility on the hospital for any failure to provide reasonable care for its patients.[[40]](#footnote-41) However, to place liability on the hospital even under enterprise liability plaintiffs still need to show either that they have received negligent care or that the hospital failed to ensure proper standard care to patients while at the hospital.[[41]](#footnote-42)

Considering all possible practices that might affect risk, including how each practice affects the risks from other possible practices, is too complex. To simplify the inquiry, courts might focus on the physician’s behavior, ignoring other factors.[[42]](#footnote-43) This practice is not a feature of the negligence regime, which should consider the costs and benefits of any risk-reducing measure.[[43]](#footnote-44) Instead, limiting the inquiry to a particular decision reduces costs of litigation in an overly complex system.[[44]](#footnote-45)

Courts simplify the problem of defining the standard of care in two ways. First, courts reduce the level of abstraction, focusing, for example, on the decisions of the medical staff but not reviewing their decision-making process.[[45]](#footnote-46) Second, courts can reduce complexity by including only a subset of the precautionary measures and risks in the negligence inquiry and ignoring other measures.[[46]](#footnote-47)

This focus on only some risks while ignoring others distorts the incentives of healthcare facilities. In example 2, the hospital tasked two nurses with counting the sponges at the procedure’s beginning and end. While counting the sponges reduces the risk of leaving sponges behind, it prolongs the procedure, increasing other risks from having an extended surgery.[[47]](#footnote-48) If complications from prolonged surgery are not considered in the negligence inquiry, hospitals might overinvest in care measures intended to reduce the risk of leaving a foreign object while underinvesting in care measures that reduce complications from prolonged surgeries. They might do so to reduce liability risk, even though such practices increase the risks to patients.[[48]](#footnote-49)

This tradeoff between setting the optimal standard of care and simplifying the negligence inquiry means that negligence law cannot create optimal incentives to invest in care measures. Focusing the inquiry on particular risks and preventative measures incentivizes injurers to invest in measures that reduce liability, not necessarily those that are socially desirable.

This gap between risk-reducing and liability-reducing measures might explain why studies find hospitals underinvest in preventing hospital-acquired infections.[[49]](#footnote-50) If the risk of contracting an infection is mostly outside the scope of the negligence inquiry, hospitals might prefer to invest in other measures that more directly affect liability.

### 2.1.2. Encouraging Defensive Medicine

A second problem of basing medical malpractice liability on the medical staff’s conduct is that it encourages practicing defensive medicine, i.e., administering costly treatments and diagnostic tests with no medical justification for their potential to decrease liability.[[50]](#footnote-51)

For example, suppose physicians fear that whenever a congenital disability that a costly prenatal diagnosis test can detect is misdiagnosed, there is a high risk they will bear liability for not administering the test. These physicians might mitigate the risk by overprescribing the test, even when it is not medically needed. Many physicians believe “defensive medicine is widespread and practiced the world over, with serious consequences for patients, doctors, and healthcare costs.”[[51]](#footnote-52) Some empirical evidence supports this claim, showing that tort reform, intended to reduce liability risk, has reduced medical expenditures and treatment intensity while not affecting patient outcomes.[[52]](#footnote-53)

However, not all defensive practices are captured by looking at expenditure. Physicians might opt for a treatment that burdens the patient more if it reduces liability risk. For example, physicians might overprescribe prenatal diagnostic test even when the test carries more risk than it can ultimately prevent, as long as the risks from the test are not considered negligent.[[53]](#footnote-54) Similarly, physician might recommend surgical delivery (c-section) to reduce risks for the newborn, even though it causes more harm to the mother because surgical delivery reduces liability risk. Physicians are sued for not recommending surgery when it would have prevented harm to the baby, while they are rarely sued for recommending surgery as a safer alternative.[[54]](#footnote-55)

Defensive medicine effectively reduces liability because the current medical malpractice law focuses on conduct. If courts did not examine the physician’s or the hospital’s conduct, they would not be encouraged to invest in producing evidence attesting to their reasonableness.

### 2.1.3. Discouraging Risk-Reducing Practices

A third concern, seldom discussed, is the adverse effect of the liability regime on practices that produce evidence of fault while reducing potential harm after an accident.[[55]](#footnote-56)

While defensive medicine refers to actions designed to manufacture evidence of reasonable conduce before an accident, physicians can also reduce liability by avoiding actions that produce evidence of fault, after an accident has occurred. Such actions, however, might increase the risk of harm to other patients or further harm patients who were already involved in an accident. Consider the following example.

Example 3. *falling patient*. Edmond underwent surgery. During the procedure, Edmonds’s body was not secured to the surgical table, and he fell, resulting in harm to his shoulder. Nassima, Edmonds’s surgeon, considers how to communicate the incident to Edmond and others in general.[[56]](#footnote-57)

Example 3 illustrates how liability risk might affect actions that, while beneficial, can increase liability risk. When a medical error, negligent or not, occurs, open communication between doctor and patient is essential for continued care as well as the psychological well-being of the patient.[[57]](#footnote-58) For Instance, Nassima may wish to apologize to Edmond for what happened during the procedure. Nevertheless, the hospital’s legal counsel might instruct Nassima to limit communication and especially refrain from apologizing, fearing that apologies would be viewed later as an admission of fault.

Nassima might also be discouraged from informing others about what happened in the operating room. While reports about accidents are essential to increase patient safety, they can also be used as evidence of fault.[[58]](#footnote-59) Furthermore, if acting on such information by purchasing new equipment can be viewed as an admission that the old equipment was sub-par, the hospital might avoid doing so to reduce liability risk, even though purchasing the new equipment is essential to reduce a known risk for future patients.[[59]](#footnote-60)

Sharing information with the patients and others promotes patient safety while producing evidence that can be construed as proving fault after an accident. In other cases, hospitals might adopt technology that increases patients’ safety by recording information, knowing that these data can also be used to prove fault. For example, electronic health records (EHR) promote documentation and easy access to patient information, improving communication between doctors. The transfer of information between physicians is a known source of errors, so simplifying communication should promote patient safety.[[60]](#footnote-61) Using EHR also assists clinical decision support systems, which may further reduce medical errors.[[61]](#footnote-62) However, EHR also creates discoverable evidence, especially metadata, which can later be used to prove liability.[[62]](#footnote-63) While efficiency would require physicians to adopt EHR based only on the system’s costs and outcomes, physicians also consider the liability risks of implementing HER, resulting in too little use.[[63]](#footnote-64) Furthermore, when only some information is recorded in EHR, treatment decisions might give excessive weight to recorded information over information that is not recorded to avoid future liability.[[64]](#footnote-65)

One way of dealing with the disincentive to adopt these risk-reducing practices is to forbid plaintiffs from presenting evidence of these practices in court. For example, many U.S. states have enacted “apology laws” that make statements of apology, sympathy, and condolence inadmissible at trial, eliminating the distortionary effect of using the apology as evidence.[[65]](#footnote-66) Similarly, the Federal Rules of Evidence states that remedial measures taken after an accident are inadmissible as evidence that the previous conduct was negligent.[[66]](#footnote-67)

While inadmissibility solves the problem that the current medical malpractice law creates, it also makes it more challenging for patients to prove negligence, which hinders tort law’s efficacy as a deterrent.[[67]](#footnote-68)

## High Administrative Costs

As we have seen, a liability regime based on negligence distorts the incentives of myriad behaviors that produce evidence regarding conduct. An additional aspect of the legal procedure we need to account for is the cost of operating the system, including legal costs, payment for experts, and evidence production. [[68]](#footnote-69)

In any negligence-based regime, proving conduct, establishing the standard of care, and proving causation create substantial administrative costs. These costs are exceptionally high in medical malpractice cases. According to some estimates, less than half of payments related to medical malpractice claims reach victims, while most are used to operate the system.[[69]](#footnote-70) That means that by reducing administrative costs, it is possible to increase compensation almost twofold and still reduce the overall costs of the liability system to insurers. These high costs harm both plaintiffs and defendants. However, defendants in medical malpractice cases, such as physicians and medical facilities, are repeat players and are usually insured. Plaintiffs are disproportionately affected by the high litigation costs and are likely to find it more difficult to find a lawyer to represent them as the costs of litigation increase.[[70]](#footnote-71) These administrative costs affect the costs of medical care. Since the medical industry incurs these costs when dealing with claims regardless of their outcomes, usually in the form of higher premiums paid to insurers, these costs are later passed down to patients.

High administrative costs limit victims’ access to courts. If the costs of the legal proceedings are prohibitively high, negligence victims will not sue. Even if some costs can be avoided by settlements early in the procedure, administrative costs may still limit patients’ excess to justice in two ways – first, hospitals might suspect that plaintiffs lack the resources to see the case through trial, refuse to settle at all, knowing that the plaintiffs will have no choice but to withdraw their claim.[[71]](#footnote-72) Second, even if hospitals agree to settle, the settlement amounts are likely to be low since the litigation costs limit the plaintiffs’ bargaining power.

Proponents of tort reform claim that frivolous lawsuits lead to skyrocketing insurance premiums.[[72]](#footnote-73) Opponents answer that the claim lacks empirical support, stating that liability risk is low, as most cases end in no compensation to the plaintiff. From the defendants’ point of view, high administrative costs may affect them even if they win most or all cases. Indeed, most plaintiffs that received reasonable care will not receive compensation.[[73]](#footnote-74) However, since insurers also pay for litigation costs, the risk of frivolous lawsuits affects the premiums even if no compensation is ever paid.[[74]](#footnote-75) High premiums may result in a shortage of practicing physicians in general and high-risk specialties (such as neurosurgery and OB/GYN) in particular.[[75]](#footnote-76) This shortage in care negatively affects all patients.[[76]](#footnote-77)

## Limited Victim Compensation

The last adverse effect of the current liability regime is that it results in grossly low compensation to victims.[[77]](#footnote-78) Medical malpractice can fulfill its goal of compensating victims only if all victims of negligent care file a claim and receive full compensation.

In practice, however, most patients who suffer injury from negligent care are never compensated, and the rest receive only partial compensation for their harm. Studies have shown that as little as 6% of negligent care victims receive compensation.[[78]](#footnote-79) Of them, most settle their case and receive only partial compensation.[[79]](#footnote-80) Even the relatively few cases that reach a final verdict are not fully compensated. A recent study shows a considerable gap between jury verdicts and payouts, as plaintiffs agree to post-verdict haircuts, limiting damages by insurance coverage.[[80]](#footnote-81)

There are several reasons for this under-enforcement problem.

First, as illustrated above,[[81]](#footnote-82) the substantial costs of litigating a medical malpractice case can discourage many patients from filling a claim. Lawyers working on a contingent fee may also be reluctant to represent plaintiffs in medical malpractice cases, knowing the substantial cost they must incur.[[82]](#footnote-83)

Second, plaintiffs must prove they received unreasonable care to win a case against a physician or medical facility. When evidence of the physician’s conduct is unavailable, patients cannot build a case, even if they have enough resources and the case has a positive expected value.[[83]](#footnote-84) This might seem like a general problem with negligence law, but it especially worrisome with regards to medical care, where physicians are in charge of recording the treatment to the patient’s medical records and informing the patient of any error.[[84]](#footnote-85)

Last, even when negligence is evident, many patients will still fail to prove that the negligent care was the cause of their injury.[[85]](#footnote-86) Patients seek medical attention because they face some risk of harm. In many, if not most, cases, it is impossible to know if the patient’s harm resulted from the negligent care he or she received or if it was an inevitable result of her underline illness.[[86]](#footnote-87) Under prevailing law, to establish factual causation, the plaintiff must show that it is more likely than not that the negligent care caused the injury.[[87]](#footnote-88) In probabilistic terms, the defendant will have to pay for the harm only if the added risk from its negligence was more significant than the risk given reasonable care. This standard solution leads to significant underdeterrence. Whenever a patient faces a high risk, causation effectively bars compensation regardless of conduct. Several states have adopted the lost chance of recovery doctrine to deal with this problem, allowing courts to award partial compensation, discounted by the reduced probability that the patient would have recovered if she received reasonable treatment.[[88]](#footnote-89)

One might think that underenforcement and partial compensation mean that the current medical malpractice law does not distort the way physicians practice medicine, as argued earlier. While the existence of underenforcement reduces liability risk, it does not (necessarily) negate these possible distortionary effects of malpractice liability. Physicians might face a small liability risk and still adopt practices that reduce expected liability and not the risk of accidents, given that small risk.[[89]](#footnote-90)

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This Part explored several ways the current medical malpractice law fails to achieve its goals – promoting patient safety and compensating victims. It showed the need to delineate the standard of care and to establish that the treatment fell below the standard, distorts the incentives of physicians and hospitals, creates substantial costs, and results in grossly low compensation to victims.

These shortcomings of the current law may explain why the U.S. health system presents poor outcomes. While the costs of medical care are higher in the U.S. than in any other country,[[90]](#footnote-91) medical outcomes fall below those of many developed countries.[[91]](#footnote-92) There are many possible reasons for this gap, but if medical malpractice law is part of the problem, it is worthwhile to explore possible solutions.

The next part shows that SLUH may solve many of the problems of the current malpractice law, at least when applied to medical facilities.

# Strict Liability for Unreasonable Harm

We can now turn to examining SLUH as an alternative liability regime. To understand how the suggested regime might work, consider the following variation on example 1, which opened the Article.

Example 3. *Hospital-acquired infections*. Alex was admitted to the hospital, suffering from a spine injury, which required a simple surgery and short hospitalization. Other than the spine injury, Alex was generally healthy. During hospitalization, Alex developed an infection, which caused permanent harm. In total, Sixty patients have contracted a similar infection during their stay in the orthopedic unit in the past month. Should Alex and the other patients be compensated for their harm?

To apply SLUH to the circumstances of Example 3, we need to ask how many patients would have contracted an infection had the hospital taken reasonable care. For now, let us assume that, given reasonable care, it is likely that only 45 patients would have contracted an infection. Applying SLUH would simply mean that the hospital is liable for the harm to 15 patients. That is the unreasonable harm.

Stating that the hospital is required to pay for the harm of 15 unidentified patients means little in terms of monetary value. The compensation varies between victims, depending on their age, income, pain and suffering, and other factors.[[92]](#footnote-93) SLUH does not call for compensating specific victims fully. Instead, each receives a fraction equal to the unreasonable harm divided by the entire harm. In this case, all 60 patients who contracted an infection should receive compensation equal to 25% of their harm$ (15/60)$. After establishing the share of the harm to all the patients, estimating damages is usually a relatively simple process. Furthermore, courts can use statistical tables to estimate the harm on average without negatively affecting deterrence to resolve any uncertainty regarding harm.[[93]](#footnote-94)

To implement SLUH as an alternative liability regime, we first need to know how courts can determine the level of reasonable harm. If courts cannot determine the reasonable harm, it will be impossible to implement this regime. The following sections deal with the informational requirements for determining reasonable harm. They show that it is possible to implement this liability regime in large medical facilities and how implementing SLUH solves many of the problems created by the current medical malpractice law.

## Determining Reasonable Harm

To implement the liability regime, courts need to determine the reasonable harm from accidents and decide if and how much the harm resulted from the injurer’s actual involvement in accidents exceeded the reasonable level.

Determining the reasonable harm level of an injurer is similar, in some respects, to determining the standard of care under a negligence regime. To assess the standard of care, courts need to examine how much each measure of care reduces the risk and magnitude of injuries. So, theoretically, after a court determines the reasonable risk from each interaction between the hospital and the patient (e.g., hospitalization day, surgery, diagnostic test), determining the level of reasonable harm is a simple multiplication of the risk from each interaction with the number of interactions. For example, if there is a 1% chance of contracting an infection for each day of hospitalization, assuming the hospital takes reasonable measures to avoid the risk, then a hospital that admitted patients for a total of 5,000 days will reasonably have 50 cases of hospital-inquired infections.[[94]](#footnote-95)

Notice that, unlike the negligence inquiry, determining the level of reasonable harm requires information about patients with no adverse event during their stay in the hospital. To start, the court needs to know the total hospitalization days of all patients, including patients that did not suffer from an infection or any other adverse event during their stay.[[95]](#footnote-96) This informational requirement is not needed under the negligence regime since it focuses on the hospital’s conduct in treating patients who suffered from an adverse outcome, disregarding other patients. Information about hospitalization days is not enough. In addition, determining reasonable harm requires information about each patient’s underlying (reasonable) risk. The reasonable risk to each patient might vary due to his or her characteristics. Hospitals might avoid liability if the reasonable harm is not adjusted by denying care for high-risk patients instead of investing in risk-reducing measures.

For example, the risk of pulmonary complications after an abdominal surgery depends on the measures the medical staff implements before, during, and after surgery.[[96]](#footnote-97) The risk may also depend on patient characteristics such as age, gender, and smoking. To adjust reasonable harm, courts will require information about actual victims as well as potential victims who never suffered any harm. If the reasonable harm is not adjusted to patients’ risk, surgery units would prefer to operate on young, female nonsmoking patients to avoid liability.[[97]](#footnote-98) Adjusting for known risk factors minimizes this incentive to avoid liability by selecting low-risk patients (an adverse selection problem).[[98]](#footnote-99)

To complete the inquiry, the court must determine the injurer’s actual harm level over the relevant period (to all victims). It might seem that this part of the factual inquiry requires the same information as in the current medical malpractice law, which bases compensation on the actual harm victims suffered. There is a significant difference, however. SLUH requires the court to know the sum of harm to all patients who had an adverse event, not just those who decide to file a claim. This requirement might pose an informational hurdle when patient information is unavailable without cooperation.[[99]](#footnote-100) When such information is readily available, the SLUH regime is best viewed as a collective litigation mechanism, similar to a class action.[[100]](#footnote-101)

After the total level of harm is established, awarding compensation is a simple matter of subtracting the reasonable harm from the total harm and dividing the compensation amongst patients who suffered harm.

## Dealing with Uncertainty and Errors

We have seen how courts can estimate reasonable harm and compare it to the actual harm level. However, as in any factual inquiry, courts might be uncertain about both the reasonable harm and the level of harm that materialized. Even when information about reasonable and actual harm is readily available, it might be inaccurate.[[101]](#footnote-102) The risk of errors in the estimation of unreasonable harm may distort the invectives that the SLUH regime creates. Even if courts are correct on average, errors in assessing reasonable harm can distort the incentives since the effects of errors are one-sided – if the court (erroneously) decides that the actual harm was above reasonable harm, the injurer is held liable for the difference. However, if the court (again, erroneously) decides that the actual harm was below the reasonable harm, the hospital will not receive a prize for creating less harm than is reasonable.[[102]](#footnote-103)

The hospital’s incentives are distorted if it knows that the court systematically overvalues the level of reasonable harm. For example, if the hospital’s reasonable harm is 100, but courts consider 130 to be the reasonable level of harm, the hospital will have no incentive to reduce the harm below 130.[[103]](#footnote-104)

The same argument is not valid for errors in the other direction – if courts systematically undervalue the level of reasonable harm, hospitals will have to pay some damages even when taking reasonable care but will not overinvest in care measures. For example, if the hospital’s reasonable harm is 100, meaning that any measure that further reduces the harm costs more than the harm it reduces,[[104]](#footnote-105) but courts consider 70 to be the reasonable level of harm, hospitals will reduce the harm to 100 and pay 30 in damages, as any further reduction in harm (by definition) costs more than it saves in damages.

This problem of errors might lead hospitals to underinvest in care even if the courts’ valuation of reasonable harm is correct on average. To see why, let us assume that while the reasonable harm is 100, courts err and may decide that the reasonable harm is 70 or 130 with equal probability. The hospital can invest 15 in care measures that reduce harm from 120 to 100, but it would not do so. The hospital’s expected liability if it invests in this care measure is 15 (50% chance it will have to pay 30 in damages) and 25 if it fails to invest in the care measure (50% chance it will have to pay 50 in damages). Meaning the hospital must invest 15 to reduce its expected liability by 10. The following table illustrates the problem.

Table 1: Errors in the estimation of reasonable harm

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Cost of care | Actual Harm | Liability if Reasonable Harm $70 | Liability if Reasonable Harm $130 | Expected Liability | Total cost |
| No Care | $0 | $120 | $50 | $0 | $25 | $25 |
| Care | $15 | $100 | $30 | $0 | $15 | $30 |

It is clear from the table that the hospital reduces its total costs, in this example, by not investing in care even though the estimation of the reasonable harm is correct on average. That is because the hospital gains nothing by investing in care when courts overvalue the level of reasonable harm.

A straightforward solution to the distorted incentives from errors is to allow negative damages, meaning that if the court determines that the harm a hospital creates falls below the reasonable harm, the hospital will receive a subsidy equal to the difference.[[105]](#footnote-106) Negative damages solve the difficulties of over-valuating reasonable harm. For example, if the hospital’s reasonable harm is 100, but courts consider 130 to be the reasonable level of harm, the hospital will invest in care and reduce the harm to 100, to receive the subsidy.

Negative damages also solve the problem of underinvestment in care when courts make symmetric errors. Consider the following variation on table 1.

Table 2: Errors in the estimation of reasonable harm with negative damages

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Cost of care | Actual Harm | Liability if Reasonable Harm $70 | Liability if Reasonable Harm $130 | Expected Liability | Total cost |
| No Care | $0 | $120 | $50 | -$10 | $20 | $20 |
| Care | $15 | $100 | $30 | -$30 | $0 | $15 |
| Excessive Care | $30 | $90 | $20 | -$40 | -$10 | $20 |

As is clear from the table, when negative damages are allowed, the effects of errors are symmetrical – the hospital bears an additional cost when courts undervalue reasonable harm, and it receives a benefit when courts overvalue it. This symmetrical effect means that the hospital’s incentives are unaffected by the risk of errors. The hospital will prefer investing in care, as doing so reduces its total expected costs. However, the hospital will not overinvest in care. Even though excessive care reduces liability when reasonable harm is set too low and increases the subsidy when reasonable harm is set too high, the added costs of care are higher than the benefit.[[106]](#footnote-107)

A second solution to the effect of errors is for courts to purposefully set reasonable harm at a low level, thus eliminating or reducing the risk of setting reasonable harm too high. As we have seen, when reasonable harm is undervalued, hospitals will bear some liability even if they take reasonable care, but they will not overinvest or underinvest in care measures. Thus, if hospitals that cause less harm than the reasonable level do not receive a subsidy, courts should set the reasonable harm at the lowest level that the evidence support.

A second source of errors in applying SLUH comes from uncertainty about the harm that occurred. Even if the courts set reasonable harm accurately, there is a risk of random variation in the actual harm. We have assumed, for simplicity, that hospitals that take adequate care can foresee the number of accidents that will happen. For example, if all medical staff members regularly wash their hands and take other precautions against infections, *exactly* 40 patients will suffer from infection over the relevant period. However, there is always variation in the harm that materializes, even when we control for factors that affect the risk.

 We can think of SLUH as a regime that detects the mean level of harm from the injurer’s conduct by using a sample – the actual harm over a specified period.[[107]](#footnote-108) As with all samples, the level detected may vary randomly, but variance decreases as the sample size increases.[[108]](#footnote-109) That means the assessment is more accurate for larger injurers, which are involved in more accidents.

Consider the example of hospital-acquired infections again. Assume that if the hospital takes educated care, on average, 100 patients will contract an infection during hospitalization in a year. Two problems may occur – first, after some time, say eleven months, the hospital might realize that despite acting reasonably, due to bad luck, 130 patients have already contracted an infection. Alternatively, the hospital might realize that despite acting reasonably (without taking excessive care), due to good luck, only 70 patients contracted an infection. In both cases, the materialized harm indicates a different level of care than the hospital’s actual investment.

The two strategies for dealing with uncertainty about the level of reasonable harm can also be applied to the variance in the actual harm. If negative damages are allowed, the hospital will take adequate care during the last month, regardless of the harm that happened beforehand, knowing that it is the best strategy to reduce its liability (if, due to bad luck, the harm was high), or to maximize the subsidy (if due to good luck, the harm was especially low).

If negative damages are unavailable, the risk of underestimating the harm (i.e., erroneously deciding that the injurer’s harm fell below the reasonable threshold) is more harmful than overestimating it. Underestimation is more harmful for the same reason that overvaluation of the reasonable harm is more harmful than undervaluation of the reasonable harm – when courts overestimate actual harm, the hospital will pay damages even if it invests optimally in care but still have adequate incentives to invest in care. However, when courts underestimate the level of harm, the hospital will have an inadequate incentive to invest in care. In the example above, if only 70 patients contract an infection after eleven months, the hospital might neglect to take care measures afterward, knowing it is unlikely it will bear any liability.

The second solution offered before – setting reasonable harm too low, can be implemented again to solve the problem of variance in the occurrence of harm. By lowering the reasonable harm threshold to reflect the variance, courts can minimize the chances that the harm that occurred will be too low by chance.[[109]](#footnote-110) Statistically, the need to reduce the level of reasonable harm to reflect the variance gets smaller when the number of patients increases.[[110]](#footnote-111) This effect of the number of victims explains why SLUH can only apply to large injurers. Smaller samples have a higher standard error, meaning that the outcome is more likely a result of chance than that of a physician’s investment in care. For small enough samples, the court will have to set the reasonable harm at zero to avoid overestimating the mean, making the regime identical to a conventional strict liability regime.

## Available Data about Reasonable Harm in Medicine

The previous sections laid out the theoretical foundations of the SLUH liability regime and showed what information is required to implement it. To replace the current medical malpractice law, we need to know – is the information required to apply SLUH currently available?

Even if the information is currently unavailable, this theoretical exercise has value. We might think that the information is worth gathering, and once the data has been compiled, we can examine the practical use of SLUH once more. However, we need not wait long. Regarding most risks, legislators can already apply SLUH as an alternative to the current medical malpractice law. Actually, even though no one suggested examining the outcomes of hospital units to determine legal liability, assessing the safety and efficacy of different departments in the hospital based on their outcomes has been practiced for some time. For example, the American Heart Association has long suggested using heart surgery patients’ outcomes and comparing them with the anticipated risk-adjusted rate of complications to assess efficacy and safety in cardiovascular surgery departments.[[111]](#footnote-112) New York State, the Veterans Administration, and The Society of Thoracic Surgeons have created cardiac surgery registries that record risk-adjusted outcome data based on these suggestions. These datasets were used to implement several performance assessments and interventions at the hospital level.[[112]](#footnote-113)

The American College of Surgeons (ACS) has implemented a much more robust voluntary program known as the National Surgical Quality Improvement Program (ACS-NSQIP). Participating hospitals send detailed reports of their surgeries, including outcomes and complications, and receive, in return, an assessment of patient safety based on risk-adjusted outcomes.[[113]](#footnote-114)

The massive dataset that ACS-NSQIP created allows physicians to assess the risk of any complication following surgery, as well as the risks of specific complications, according to the surgery type, the patient’s comorbidities (e.g., hypertension, diabetes, or cancer), and personal characteristics that might affect the risk of complications, such as age, sex, weight and smoking habits.[[114]](#footnote-115) Since these risk calculations assume reasonable care, we can assess a unit’s risk-adjusted rate of complications, such as surgical-site infection,[[115]](#footnote-116) and compare them to the actual rate a unit experiences.

These risk management programs are very similar to SLUH. Programs such as ACS-NSQIP use the data to provide recommendations for specific interventions. For example, an analysis of a particular unit might show a higher risk of surgical-site infection in the hospital than predicted, assuming reasonable care, but a lower risk of urinary tract infection than the prediction. From a management standpoint, information about both risks is valuable – the information about the surgical site infection suggests that doctors and nurses in the unit can adjust their procedures to reduce the risk. The information about the urinary tract infection rate risk might suggest that a practice used in the unit can effectively reduce such risk and should be studied further. Alternatively, assuming the reasonable risk assessment is accurate (meaning that there are no cost-justified ways to reduce the risk further), such information might suggest that the staff over-invest in reducing one type of risk, creating excessive, unjustified medical expenses or increasing other risks to the patients.[[116]](#footnote-117)

There are two ways to apply the information to the SLUH regime. The first way is to examine each department separately (assuming each department has enough patients), and within every department, examine the harm from medical errors, infections, complications, and other relevant risks separately. According to the second way, courts should examine the total harm from any complication in the entire hospital and not focus on different risks in different units.

The first option resembles the negligence inquiry under the current medical malpractice law. We usually think of reasonable care vis-à-vis a specific risk that precautions might prevent.[[117]](#footnote-118) Following the same structure, we should look at specific risks and not the overall patient harm. It also provides valuable information to the hospital (and other hospitals) about the risks it needs to decrease further.[[118]](#footnote-119)

The second option offers several advantages. First, dividing risk types might obscure cases of unreasonable harm because the risk of specific complications might be too low to detect deviations if the hospital is not big enough. Second, from an incentives standpoint, we care about the total harm, not the rate of one type of complication. When a practice reduces one type of risk but increases another, it should be encouraged if it lowers the total expected harm from both complications. By looking at each complication separately, we might discourage such practices.

Interestingly, negative damages allow us to enjoy the benefits of both alternatives. Courts should assess each risk and unit separately, thus informing the hospital about unreasonable harm, indicating that the hospital should adopt specific practices. At the same time, if the hospital realizes it can reduce one type of risk below the reasonable harm threshold while creating another less substantial risk, it would do so, knowing it can enjoy the subsidy attached to lower-than-reasonable harm.

Courts can use the rich data regarding the risks to further adjust the reasonable harm assessment to hospital characteristics that are not patient-related.[[119]](#footnote-120) For example, smaller-volume hospitals may have a higher risk of surgery complications than high-volume ones.[[120]](#footnote-121) Courts should consider only those hospitals’ characteristics related to the cost of care measures. [[121]](#footnote-122) If low-volume hospitals’ complications rate is higher because the volume is correlated with resources and hospitals with fewer resources cannot invest as much in care, the reasonable harm should be adjusted to the hospital resources, but not to volume. If a high volume of surgeries provides experience in performing surgeries, which affects the success rate, reasonable harm should be adjusted accordingly.

To conclude, programs such as ACS-NSQIP show that it is possible to assess reasonable harm, at least regarding complications and medical care errors. This conclusion should not come as a surprise. Medical care, in general, and particularly in hospitals, is information-intensive. Hospitals track information as part of the treatment in the patient’s medical records and submit it to insurers for payment. The collected data includes treatments and outcomes of all patients, allowing us to compare reasonable harm to actual harm.[[122]](#footnote-123)

One limitation to SLUH is the requirement of continuous excess to data about patient’s characteristics and outcomes. ACS-NSQIP and similar programs gather data based on the continuous cooperation of participating hospitals. These hospitals receive advice about how to improve patients’ safety, so they have no incentive to send misleading information. We might fear that once the information is used to assign liability, hospitals will not share the information willingly, and that some might try to hide complications, or overestimate patient’s risks. This fear is justified, as some complications, such as infections, are recorded well in patient’s charts but are underreported in insurance claims.[[123]](#footnote-124) This risk, however, can be mitigated. First, by deciding to apply SLUH hospitals should be required to grant access to patient-level data, directly from their medical charts. It is difficult to under report a complication in the patient’s chart. This data can be further supplemented with post-discharge patient surveys,[[124]](#footnote-125) and the data’s accuracy can be examined by reviewing a random sample from the patient pool.

## Advantages of SLUH to Medical Malpractice Law

Tort reforms became popular tool legislators use to deal with medical malpractice liability’s shortcomings.[[125]](#footnote-126) The most common reform used to decrease medical malpractice liability is placing caps on damages.[[126]](#footnote-127) Even the ban on apologies as evidence of negligent treatment was recognized as a (soft) form of tort reform.[[127]](#footnote-128) The data suggest these reforms failed to significantly reduce the costs of medical care, increase access to care or improve safety. The current system’s limitations include the inadequate incentives it produces to invest in reasonable precautions,[[128]](#footnote-129) the system’s high administrative costs,[[129]](#footnote-130) and its low compensation rate.[[130]](#footnote-131) SLUH solves all these problems.

### 3.4.1 SLUH Creates Better Incentives to Invest in Care

Current law distorts the incentives in three ways – it encourages hospitals to prioritize care measures that are more likely to be part of the negligence inquiry, it encourages defensive medicine, and it discourages risk-reducing practices which may later be used as evidence. SLUH solves these distortions.

First, under the current medical malpractice regime, when some practices reduce risk but are not captured by the negligence inquiry hospitals have no incentive to invest in them. The problem does not occur under SLUH. Under this regime, liability depends only on outcomes. This emphasis on outcomes incentivizes hospitals to take any measure that reduces patients harm at a low cost, regardless of the ability to observe such practices or prove them in court.

Consider, for example, the response time at an intensive care unit (ICU). Patients in the ICU are connected to a monitor that sounds an alarm if the patient’s vital signs cross a threshold. The nursing staff‘s response time affects patient outcomes and is easy to monitor and record. In such cases, the court might examine only the staff response time to the alarm, ignoring other, less salient circumstances. In response, nursing staff at the ICU might try to reduce the response time to every alarm, resulting in more harm than good. For example, sterilization might be impaired if a nurse abruptly stops a sterilized treatment for one patient to respond quickly to the alarm from another patient’s monitor.[[131]](#footnote-132) If liability depends solely on outcome, as is the case under SLUH, nursing staff and physicians will try to minimize adverse events instead of minimizing response time.

Second, SLUH eliminates the incentives to adopt defensive practices. These practices are supposed to reduce liability risk without affecting patient outcomes at a reasonable cost. Since under SLUH, liability is solely determined by patients’ outcomes, physicians will be encouraged only to apply tests and treatments which are likely to (efficiently) affect outcomes.

Third and last, SLUH reduces the disincentive to collect and share information about mistakes. Under current medical malpractice law, information about preventable harm and errors might lead to litigation and liability.[[132]](#footnote-133) As a result, even though sharing information about mistakes is essential to reduce further mistakes in the future and for healthy communication with the patient, hospitals might refrain from doing so. Under SLUH, sharing information becomes a vital tool to reduce liability. While it is true that physicians might still be reluctant to tell their colleagues about their mistakes for reputational reasons,[[133]](#footnote-134) at least the legal system under SLUH works against this tendency instead of encouraging it.

Adopting SLUH might even indirectly promote patient safety and care. Currently, ACS-NSQIP and similar programs are primarily voluntary. They are limited to a subset of medical practices and participating hospitals. Nevertheless, the massive amount of information gathered by ACS-NSQIP allows researchers to explore numerous questions regarding care practices,[[134]](#footnote-135) staff management,[[135]](#footnote-136) and risk factors for diseases or complications.[[136]](#footnote-137) Under SLUH data will be collected from more hospitals, covering more procedures and risks. This trove of information can offer a much more extensive database for future studies, further advancing patients’ safety and care.

### 3.4.2 Reducing Administrative Costs

The current liability system creates high, often prohibitive, litigation costs for plaintiffs, with increasing costs for defendants as well.[[137]](#footnote-138) One reason for this high cost is from the tendency of the plaintiff to sue multiple defendants, including physicians and hospitals.[[138]](#footnote-139) Under SLUH, only the hospital is sued, since the individual physician and her or his conduce are irrelevant to the liability regime.

More importantly, the high costs of litigation stem from the need to collect evidence and produce expert reports regarding conduct and causation.[[139]](#footnote-140) The cost of litigating these issues is substantial even relative to the stakes of the average case.[[140]](#footnote-141) SLUH eliminates some of these costs. For example, since the court compares between the reasonable harm and the harm that occurred without trying to identify which incident resulted from which conduct, there is no need to prove causation in any individual case. Furthermore, conduct is never examined relinquishing the need to collect evidence about the standard of care in each incident as well as about the actual conduct.

 SLUH creates its own costs, including the need to collect the data about patients and assess it. Furthermore, if the data might be manipulated, plaintiff lawyers should sample it, reviewing patients and compare their information to the data collected from the hospital. Nevertheless, this still costs much less, per case, than the current regime. Assessing a sample of patients is costly, but the information is readily available. Examining conduct requires much more evidence that is likely unavailable.

### 3.4.3. Increasing Enforcement

The last major concern regarding the current liability regime is that most victims never receive any compensation.[[141]](#footnote-142) This well-known phenomenon can be attributed, at least partially to the high litigation costs and difficulty to prove negligent conduct and causation. Since the expected liability form negligence is much lower than the expected harm, the current law is a poor deterrent.

SLUH solves the problem of underenforcement. SLUH liability regime operates as an aggregated litigation, similar to class actions. Like in class actions, lawyers and class representatives collect the evidence and manage the litigation for all the class members. Victims do not necessarily have to even know that their case is being litigated until courts assign liability and the compensation stage commences.

One concern about enforcement in aggregative litigation is that once the court decides to distribute damages it might not locate all of the class members. In class actions, deal with undistributed funds in several ways, such as diverting the funds to charitable projects important, by applying the doctrine of cy pres. SLUH offers a simpler solution. Recall that under SLUH each victim receives only partial compensation. When several class members cannot be located, the court should increase damages awards to the rest accordingly.

# Criticism and Objections

The central objection to the SLUH regime might be that victims of negligent treatment will receive only partial compensation for the harm they suffered. Partial compensation may seem especially troubling for patients that can easily prove that their harm resulted from negligent treatment, but the total harm was below the reasonable harm threshold. Another possible objection to the SLUH regime is that it might encourage practices that reduce harm in the short run while discouraging practices that may temporarily increase patient risk but will substantially improve patient safety over time. Finally, one could argue that other liability regimes could cure some or all the inefficiencies created by the current medical malpractice regime. This Part addresses each of these objections in turn.

## Compensating Victims

When hospitals are liable under SLUH, the amount paid in damages is close to the amount the hospital would have paid under the negligence regime, assuming perfect enforcement – meaning if every patient with a valid claim sued the hospital and received full compensation. However, the distribution of compensation amongst patients is entirely different. While under the negligence regime, only victims of negligent care receive compensation, under SLUH, every patient that suffered from an adverse event is (partially) compensated.

There are two possible objections to the compensation under SLUH. First, victims of negligent care receive only partial compensation, denying them some or even most of the compensation they would have received under negligence. Second, one could argue that the hospital, as a tortfeasor, harmed in the normative sense only those patients who received negligent care and suffered harm. Other patients have experienced an undesirable outcome to the treatment, but since the hospital and its workers treated them reasonably, these adverse outcomes result from bad luck and not from a violation of their rights. It is not easy to reconcile these characteristics of the SLUH regime with corrective justice principles, which require an injurer to rectify the normative loss to the victim of negligent care.[[142]](#footnote-143) In this regard, SLUH may be considered unjust to the hospital and victims. It is unjust for the hospital which compensates patients who did not suffer from a normative loss.[[143]](#footnote-144) It is unjust for the victims of negligent care, whose normative loss is not fully rectified by compensation. Nevertheless, several reasons to prefer the compensation scheme under SLUH over maintaining the existing liability system go beyond the already discussed incentivizing rationale.

The first reason is that the distinction between negligent and nonnegligent treatment is unclear. For tort law to promote corrective justice principles, we need to delineate the scope of reasonable care. However, as was discussed earlier,[[144]](#footnote-145) even if the definition of negligent care is clear, examining all the relevant factors is impossible. To deal with the complexity of examining every risk and risk-reducing measure, courts ignore some risks in the negligence inquiry. This means that current medical malpractice law is inaccurate as it is in defining fault.

The second reason partial compensation to all patients might be preferable to compensating only some patients is that risk-averse patients would prefer ex-ante to receive partial compensation with certainty than partial compensation with some probability.[[145]](#footnote-146) Patients face some risks regardless of the hospital’s care level. Let us assume that out of 1000 patients, 50 suffer harm from reasonable risk, and additional 50 suffer harm from negligent care. *Ex ante*, risk averse patients will prefer to receive compensation for half of the harm whenever harm is done over receiving full compensation but only in half of the accidents.[[146]](#footnote-147)

Additional reason for patients to prefer SLUH to the current system is that patients pay for the distorted incentives that the current regime creates. when physicians and hospital pay high insurance premiums and adopt defensive practices, these costs are directly born by patients. Adopting SLUH will decrease the costs of care and improve outcomes, while retaining a (limited) right of compensation when the hospital’s negligent care increased the harm it caused to patients.

Last, and most importantly, while SLUH might not fully adhere to the principles of corrective justice, it is undoubtedly better than the current medical malpractice law. Today a tiny fraction of patients receives any compensation, and of them a vary small fraction receive full compensation.[[147]](#footnote-148) It is difficult to argue that the current system promotes justice when in practice many patients are injured by negligent care and practically no one is compensated.[[148]](#footnote-149) Under SLUH hospital’s duty to compensate is closely related to their violations of patients right, and when they do cause unreasonable harm, victims receive at least partial compensation.

## Short-termism under SLUH

Short-termism refers to the tendency to give excessive weight to short-term outcomes over long-term outcomes. In the medical malpractice context, short-termism would be to adopt practices that reduce risk in the short term over practices that might not affect, or even increase short-term risk, but significantly decrease risk in over a longer term.

The SLUH regime assigns liability according to the harm the hospital creates over some period. A problem may arise when investments in care may increase harm in the immediate period but significantly decrease it over the next several time intervals.

For example, the hospital might consider purchasing a new electronic health record system (EHR). These systems improve information sharing between different departments treating the patients within the hospital, reducing the risk of errors in the transfer of patients. However, these systems require learning and getting used to, which takes time. During that time, more accidents might occur.

Interestingly, if the state offers negative damages (i.e., a subsidy for hospitals that create less than reasonable harm), or set a low level of reasonable harm, than hospitals will still have an incentive to invest in these precautions – the hospital will know that in the short run it might pay more damages, but in the ling run decreasing the harm it causes will translate to lower (or even negative) damages.

One case that might pose a significant problem is physician’s training. Physicians learn much through practice. New doctors go through residency to learn how to treat patients, during which they constantly treat patients (albeit, under some supervision). While physicians learn, they cause more risk. Limiting what residents do can reduce the risk in the short run, but it hinders their training, and increases the risk to (other) patients in the long run. The problem is that, unlike acquiring new technology, when the hospital invests in training physicians by allowing more errors, and pay more compensation, it cannot recoup on the investment. Physicians often change workplaces, especially after residency. In other words, physicians training programs create a public good, and should encouraged.[[149]](#footnote-150)

The specific problem of physician training can be solved under SLUH through the determination of the reasonable harm. We have already seen that the reasonable harm level should be adjusted for hospitals’ characteristics. Having a training program is another characteristic that courts should consider when determining the level of reasonable harm, as to encourage hospitals to train physicians.

## Other Alternatives

The shortcomings of the current medical malpractice law can be delt with other alternatives, and not just SLUH. In this section I briefly discuss some of these alternatives.

The first and most obvious alternative to SLUH is a simple rule of strict liability, or a no-fault system. Under this rule hospitals will pay for every adverse event in the hospital, regardless of fault. Such a system is even cheaper to implement than SLUH, as the court needs not assess the level of reasonable harm. Furthermore, the hospital pays for the harm as well as for harm prevention creating perfect incentives to invest in care. No-fault system also eliminates the incentives for defensive practices, since fault is not dependent on evidence of conduct. Last, since patients do not need to litigate complicated issues it will likely solve the problem of underenforcement.

No-fault liability, however, creates other problems that might make it less efficient than the current, negligence-based regime, and strictly less desirable than SLUH. As we have mentioned earlier, SLUH can be applied to any adverse even, including errors, complications, and hospital-acquired infections. To apply no-fault regime to these risks is impossible. The costs of paying for all adverse events in a hospital, most of which are due to nature and are outside the hospital’s control, is astronomical. Furthermore, hospitals might decide not to treat high-risk patients, or otherwise require these patients to pay high premium for the liability risk that they create.

Courts can theoretically apply strict liability only to medical errors, negligent or not, and not to every adverse result of medical care. This alternative creates two problems, like the issues plaguing the current negligence regime. First, the hospital will have no incentive to reduce risks that fall outside the scope of what is considered medical error under the regime, even when it is possible to reduce it. Programs such as ACS-NSQIP show that some hospitals fail to use available measures to reduce the risks of complications, and these oversights are not considered medical errors.

 Second, for any complication the court will have to determine if it was caused be medical error or not, requiring an assessment of both the medical care and causation. In many instances, patients might not know if their harm came about due to medical error. Proving causation aggravates the problem. Many patients face an inherently high risk, which is why they seek medical care in the first place. Since patients face risk regardless of care, proving that the medical error, and not the inherent risk, caused their harm is inherently difficult. These evidentiary constraints limit patients’ ability to effectively receive compensation for strict liability to medical errors.

Last, we need to consider the public need in excess to medical care. While in many cases patients suffer harm, and often die, from error in care and preventable infections, in many more cases these outcomes are unpreventable. Holding doctors and hospitals accountable for harm in these instances increases the costs of providing care. These costs may limit the access to medical care, which is much more detrimental to patients than receiving any care, even when it is inadequate.[[150]](#footnote-151)

One last alternative worth exploring is negligence regime coupled with proportional liability. In a proportional liability regime, instead of proving causation as a precondition for compensation, the court awards compensation in every case plaintiffs proved that they received negligent care, discounted by the probability that the harm was caused by the physician’s negligent conduct.[[151]](#footnote-152)

In some ways, SLUH regime is similar to proportional liability. Under SLUH each victim receives compensation discounted by the probability that his or her harm would have been avoided had the hospital acted reasonably when treating all its patients.[[152]](#footnote-153) However, SLUH has an informational advantage since it does not require the court to assess the conduct and the probability of causation in each case. Instead, SLUH averages the ratio between reasonable and unreasonable harm across all cases. Thus, while proportional liability is likely better in creating incentives than the current negligence-based regime,[[153]](#footnote-154) SLUH is cheaper to implement and creates better incentives for hospitals to reduce risks to patients.

# Applying SLUH to other areas of Tort Law

Thus far we have explored the advantages of SLUH as an alternative to medical malpractice law. This regime, however, can apply to other areas of tort law.

In general, the SLUH regime should be considered whenever an injurer harms many victims regularly, and it is difficult and expensive to set the standard of care, observe the conduct and prove causation in each incident.

One type of cases that meets all these criterions is mass exposure cases due to pollution. Environmental torts pose a significant causation problem. Even if courts can determine that a tortfeasor increased the risk to the people exposed, it is impossible to determine afterwards who developed their illness from the exposure. If the law allows the polluter to create some harm from pollution,[[154]](#footnote-155) it would be even more difficult to decide who developed the disease because of the excessive pollution. SLUH solves this difficulty by awarding damages according to the excess harm, without requiring victims to prove causation.

Product liability might be another prominent example. Liability for design defects presents many of the same difficulties as liability for negligence.[[155]](#footnote-156) Plaintiffs need to prove the design is defective, and after having done so, each plaintiff needs to show that her accident was caused, in fact, by the defective product.[[156]](#footnote-157) When the use of a particular product might reasonably result in accidental harm, it is easier to determine if the harm from products crossed this reasonable harm and make the manufacturer pay damages for the difference than to determine if an alternative and safer design were reasonable.

This is especially true for A.I. devices and autonomous vehicles (A.V.) The design of these devices raises challenging questions regarding tort liability. Automobile accidents (including nonlethal accidents) are very common.[[157]](#footnote-158) While A.V. should be safer than human drivers, as robots are not prone to lapses in attention and other human failings, it is rather difficult to design a system that can determine when such a device malfunctioned or was defective in the sense that another design would have prevented a particular accident. There are two main issues with finding an A.I. device defective. First, most devices use learning algorithms which renders their decision-making process a “black box.”[[158]](#footnote-159) The device learns patterns from information not easily translated to considerations humans can easily follow.[[159]](#footnote-160) For example, if an A.V. decides to swerve at a certain point on the road, the car’s actions might have been a result of a malfunction, or it might have been the optimal action the car could have taken in the situation to reduce the expected harm from collision. It is unlikely that future inquiry into the actions could easily distinguish between the two options.

Second, looking at the actions of the A.I. device in a particular instance challenges how we would usually define a design defect.[[160]](#footnote-161) These devices make decisions that until recently were reserved for human actors, but follow a different decision-making process than humans. the only practical way to examine if their design is not reasonably safe is to examine their rate of accidents, and not their decision in a particular instance. Again, think of road accidents by A.V. Assume that one manufacturer succeeded in designing a system that reduces the risk of road accidents by 50%, compared to human drivers, but it does so by avoiding all accidents that human drivers would not have avoided and created a new risk of road accidents which reasonable human drivers would always avoid. By focusing only on the accidents of the A.V.s are involved in, courts might determine that the design is defective since even the alternative of human drivers is safer. Only by comparing the total harm these devices caused over time to a reasonable harm assessment is it possible to determine if the design of these devices is reasonably safe, compare to the alternative (be it a human reasonable driver, or another design of A.V.).

Theoretically, it is possible to use strict liability for all A.I. devices, regardless of defects. Strict liability, however, may stifle innovation and create entry barriers, harming competition between manufacturers.[[161]](#footnote-162) Furthermore, strict liability may disincentivize people who use these devices. Last, when devices interact with human actors, strict liability disincentivizes the human counterpart to invest in care.[[162]](#footnote-163)

# Conclusion

Tort liability presents a peculiar regulating tool. It aims to reduce accidental harm but does not try to observe the overall harm injurers create over time, even when such information is readily available. Instead, the tort system imposes liability based solely on conduct. For the paradigmatic injurer and victim, there are no practical alternatives. When an injurer is involved in only a few accidents in his or her lifetime, making any meaningful statistical inference from their occurrence is impossible. Most car drivers, for example, will ever be involved in only a few accidents, if that. Similarly, most physicians might make a medical error, but very few are involved in several severe instances over a short period. Thus, the only liability regimes available when dealing with small-scale injurers are based on their conduct or strict liability.

The same is not true for large organizations involved in many accidents. Examining these organizations’ care levels in every instance makes little sense for these injurers. This Article analyzed the use of the SLUH regime and examined how applying it to medical facilities can promote patient safety and reduce the costs of medical care.

As mentioned before SLUH regime requires a large injurer. In the medical context, the regime applies to hospitals, not private practices. Still, it offers a significant change to the medical malpractice system. Hospitals employ around forty percent of the doctors operating in the U.S. and more than half of the physicians in most E.U. Member States.[[163]](#footnote-164) Furthermore, many of the high-risk procedures, which would benefit most from a functioning tort system, are done in hospitals. The current liability system fails most patients. It offers little in terms of compensation while distorting treatment decisions. Patients should welcome the shift to the SLUH regime. Doctors should welcome it as well. Many complain about the fear of liability and the incentive it creates to overprescribe, overtest and overtreat.[[164]](#footnote-165) These phenomena should disappear under SLUH.

1. \* Assistant Professor, Bar-Ilan University, Faculty of Law. For helpful comments and suggestions, I thank Ronen Avraham, Shahar Dillbary, Alon Klement, Ariel Porat, Ohad Somech, Avraham Tabbach, Tom Tzur, participants of the European Law and Economics Association annual conference, the Israeli Private Law Association annual conference, Bar-Ilan law school faculty workshop and Bar-Ilan Law School Law and Economics Workshop. Last, I thank Michael Goldboim and Noam Moser for very able research assistance. [↑](#footnote-ref-2)
2. *See* Richard A. Posner, Economic Analysis of Law §6.1 (9th ed. 2014) (explaining that reasonable care, under negligence liability law, is defined by a marginal cost-benefit analysis, inducing injurers to optimally invest in care). [↑](#footnote-ref-3)
3. According to 2020 statistics, motor vehicle accidents involving injury occur, on average, once every 1,702 thousand miles driven. Car owners drive 10,900 miles on average each year, meaning that drivers are involved in an accident that causes bodily injury, on average, once every 156 years. *See* Nat’l Highway Traffic Safety Admin., Fatality Analysis Reporting System (2020), <https://www.fars.nhtsa.dot.gov/Main/-index.aspx>. [↑](#footnote-ref-4)
4. The example is based on the case of Gahm v. Thomas Jefferson Univ. Hosp., 2000 U.S. Dist. LEXIS 2072. [↑](#footnote-ref-5)
5. Patchen Dellinger et al., *Hospitals Collaborate to Decrease Surgical Site Infections*, 190 Am. J. Surgery 9 (2005) (stating that many hospitals underutilize simple procedures that are known to reduce surgical site infections. Hospitals who participated in the study implemented several practices and reported 27% decrease in infection rate.) [↑](#footnote-ref-6)
6. *See*, *e*.*g*., John M Boyce & Didier Pittet, Guideline for hand hygiene in healthcare settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/ APIC/IDSA Hand Hygiene Task Force, 30 Am. J. Infection Control 1 (2002) (recommending that medical staff be obliged to wash their hand thoroughly before each contact with a patient); Graham Jacob, *Uniforms and Workwear: an Evidence Base for Developing Local Policy*, NHS Department Health Policy (2007), available at <https://data.parliament.uk/DepositedPapers/Files/DEP2009-0656/DEP2009-0656.pdf> (neck-ties and hand jewelry should not be worn in any care activity which involves patient contact, since they might harbor pathogens and increase the risk of infections). [↑](#footnote-ref-7)
7. *infra,* note 34 and accompanying text. [↑](#footnote-ref-8)
8. *Supra* note 3. [↑](#footnote-ref-9)
9. *Id*, at 8. [↑](#footnote-ref-10)
10. Courts have declined shifting the burden of proof in case of a hospital-acquired infection, stating that infections ordinarily occurs in the absence of negligence. *See* BARS v. PALO VERDE Hosp., 2005 Cal. App. Unpub. LEXIS 9326. Statute of limitation poses an additional difficulty in cases where the harm itself does not suggest that the physician breached the standard of care. In these cases, if alleged injuries did not suggest they were the result of anything other than natural consequences of a recognized medical treatment, the statute of limitation only commences when the plaintiff has knowledge of the negligent conduct. *See, e.g.*, Moore v. Morris, 475 So. 2d 666 (Fla. 1985). [↑](#footnote-ref-11)
11. Hand hygiene is one of the main strategies for reducing the incidence of healthcare-associated infections, and thus id included in national guidelines. Despite the universal acceptance of this cheap infection-preventative measure, hospital consistently battle low level of compliance among healthcare workers. *See, e.g*.,L. Kingstone, N.H. O’Connell & C.P. Dunne, *Hand hygiene-related Clinical Trials Reported since 2010: A Systematic Review*, 92 J. Hospital Infections 309 (2016). [↑](#footnote-ref-12)
12. *But see* Knight v. West Paces Ferry Hosp., Inc., 585 S.E.2d 104 (2003) (a direct verdict for the defendant was reversed on appeal, since the testimonies of the plaintiff and her husband regarding nurses’ hand-washing practices were sufficient evidence for the jury to consider). [↑](#footnote-ref-13)
13. *See*, *e*.*g*.,Jelinek v. Casas, 328 S.W.3d 526 (Tx. Sup. 2010) (hospital was negligent in not treating the patient with antibiotics following a surgery, but patient’s family could not establish that the patient would have suffered less from the infection she contracted if antibiotics had administered sooner). [↑](#footnote-ref-14)
14. *infra,* text accompanying note 90. [↑](#footnote-ref-15)
15. Since under SLUH there is no way to tell which patient suffered harm as a result of negligence, the hospital should pay each patient partial damages, equal to the share of excess harm relative to the entire harm. *See infra,* part 3.1. [↑](#footnote-ref-16)
16. Determining causation, as a scientific endeavor, is a known missing data problem – for any person examined in the study we know only the outcome that materialized for the received treatment, but we cannot know what would have been the outcome of any other (control) treatment. For that reason, science can only infer average causal effects for many individuals. *See* Guido W. Imbens & Donald B. Rubin, Causal Inference for Statistics, Social, and Biomedical Sciences – An Introduction, 14 (2015) (explaining that “…the problem of causal inference is… a missing data problem: given any treatment assigned to an individual unit, the potential outcome associated with any alternate treatment is missing.”) [↑](#footnote-ref-17)
17. For example, if given reasonable care, patients have a 5% average risk of suffering from an infection, then we can reasonably reject the hypothesis that all patients received reasonable care given a rate of patients that contract an infection exceeding 5% by a large enough margin. Patients might face an elevated risk of infection but a lower risk of other complications. These outcomes might be a result of the same decision. *See* Leslie D Hillis et al., *2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines*, 124 Circulation 652, §5 (2011) (presenting the data on adverse clinical outcomes of surgery patients and risk-assessment models that estimate the rates at these various adverse events occur). For example, if the hospital decided to reduce the time between admission and treatment, it might increase the risk of some complications but reduce risks associated with delay in treatment. A comprehensive liability regime should consider all the risk associated with the treatment together. *See infra,* part 3.1. [↑](#footnote-ref-18)
18. *infra*, part 3.3. [↑](#footnote-ref-19)
19. The center of disease control and prevention considers healthcare-associated infections as one of the “winnable battels”, defined as a public health risk with large scale impact on health and proven strategies that can substantially ameliorate it. *See* Center for Disease Control and Prevention, *Healthcare-Associated Infections (HAIs)*, CDC Winnable Battles Final Report (November 2016), <https://www.cdc.gov/winnablebattles/report/docs/winnable-battles-final-report.pdf> (hereinafter *Winnable Battels Report*). According to the CDC it is possible to prevent up to 70% of healthcare-associated infections. For an analysis of prevention efforts in hospitals, *see* Patchen Dellinger et al., *Hospitals Collaborate to Decrease Surgical Site Infections*, 190 Am. J. Surgery 9 (2005) (states that many hospitals underutilize simple procedures that are known to reduce surgical site infections. Hospitals that participated in the study implemented several practices and reported 27% decrease in infection rate). [↑](#footnote-ref-20)
20. *See* Sarah L. Krein, et al., *Preventing Hospital-Acquired Infections: A National Survey of Practices Reported by U.S. Hospitals in 2005 and 2009*, 27 J. General Internal Med. 773, 773 (2012) (citing several studies reporting that the rate of hospitals-acquired infections is 5%-10%, resulting in approximately 99’000 deaths in 2002). *See also*, Winnable Battles Report, *supra* note 18, at 9 (same). [↑](#footnote-ref-21)
21. *See, e.g.,* Brian J. Kopp et al., *Medication Errors and Adverse Drug Events in an Intensive Care Unit: Direct Observation Approach for Detection*, 34 Critical Care Med. 415 (2006) (revealing that adverse drug events commonly occur in hospitalized patients and are frequently associated with human error.) [↑](#footnote-ref-22)
22. *See, e.g.,* David E. Newman-Toker & Peter J. Pronovost, *Diagnostic Errors – The Next Frontier for Patient Safety*, 301 JAMA 1060 (overviewing current studies about the scope of medical adverse events due to diagnostic errors.) [↑](#footnote-ref-23)
23. *See, e.g.,* Richard S. Yoon et al., *Using “Near Misses” Analysis to Prevent Wrong-Site Surgery*, 37 J. Healthcare Q. 126 (noting that wrong-site procedures in the United States, including surgeries, occur at least 40 times a week.) [↑](#footnote-ref-24)
24. *See, e.g.,* Verna C. Gibbs et al., *Preventable Errors in the Operating Room: Retained Foreign Bodies After Surgery - Part I*, 44 Current Probs. Surgery 281 (2007) (discussing the large scope of adverse medical outcomes due to retained surgical items in the U.S.) [↑](#footnote-ref-25)
25. The analysis assumes that hospitals can be directly or indirectly liable for patients, ans indeed that is the case. When a hospital fails to adopt reasonable practices it can be directly liable via corporate negligence doctrine, which does not require the plaintiff to establish the negligence of a third party. *See* Thompson v. Nason Hosp., 527 Pa. 330, 339 (1991). Furthermore, hospitals are vicariously liable for the negligent practices of its surgeons, nurses and other members of the medical staff. *See* Johns v. Jarrard, 927 F.2d 551, 556 (11th Cir.1991) (stating that hospitals are vicariously liable for the malpractice of its emergency room physicians merely by assuming control over their time, regardless of the hospital’s ability to control their performance); Atwood v. UC Health, 2018 U.S. Dist. LEXIS 146817 (same). Last, hospitals may even be liable for the negligence of an independent, private attending physician, if it creates the impression that the physician acts on behalf of the hospital. *See* I.M. v. United States, 362 F. Supp. 3d 161, 199 (2019) (“vicarious liability for the malpractice of a private attending may also be imposed upon on a hospital under a theory of apparent or ostensible agency.”) [↑](#footnote-ref-26)
26. According to the OECD, in 2019 the U.S.’s expense on health was 16.8% of its GDP. The expenditure of the second highest country, Germany, is only 11.7% of its GDP. The gap is even larger when measured in dollars per capita. *See* Joint OECD, EUROSTAT and WHO Health Accounts SHA Questionnaires (JHAQ), available at <https://stats.oecd.org/Index.aspx>. [↑](#footnote-ref-27)
27. Treatable mortality are deaths that can be avoided through timely and effective health care interventions. According to the OECD, all western European countries, as well as Chile, Israel, Slovenia, Canada, Australia, New Zealand and Korea have a lower rate of treatable mortality than the U.S. Data for the calculation of treatable and preventable mortality are drawn from the WHO Mortality Database available at http://www.who.int/healthinfo/statistics/mortality\_rawdata/en/index.html. [↑](#footnote-ref-28)
28. *See* John T. James, *A new, evidence-based estimate of patient harms associated with hospital care*, 9 J. Patient Safety, 122 (2013) (estimating that more than 200,000 people die yearly in the U.S due to medical error); John T. James, *Deaths from preventable adverse events originating in hospitals*, 26 BMJ Quality & Safety 692, 692–693 (2017) (same); Martin A Makary & Michael Daniel, *Medical error-the third leading cause of death in the U.S*., 353 The BMJ (2016) (same); Kaveh G Shojania & Mary Dixon-Woods, *Estimating deaths due to medical error: the ongoing controversy and why it matters*, 26 BMJ 423 (2017) (claiming that the estimation of quarter-million deaths per year is likely an underestimation, making medical error the third leading cause of death in the U.S.). [↑](#footnote-ref-29)
29. Paul C. Weiler, *Reforming Medical Malpractice in a Radically Moderate – and Ethical – Fashion*, 54 DePaul L. Rev. 205, 215 (2005) (“[T]here is just one paid malpractice claim for every twenty-one negligent medical injuries”) [↑](#footnote-ref-30)
30. The tendency of medical malpractice victims not to sue also makes medical malpractice law a poor deterrent. *See* Tom Becker, The Medical Malpractice Myth, 22-44 (2005) (claiming that the real problem is too little litigation and too many incidents of medical malpractice). [↑](#footnote-ref-31)
31. For an extensive evidence based examination of the challenges the medical malpractice system, as well as critical analysis of the effects of tort reforms on outcomes and medical costs, *see* Bernard Black, et al., Medical Malpractice Litigation : How it Works, Why Tort Reform Hasn’t Helped (2021). [↑](#footnote-ref-32)
32. The example is loosely based on the facts in Cefaratti v. Aranow, 138 A.3d 837 (Conn. 2016). [↑](#footnote-ref-33)
33. Alan Merry & Alexander McCall Smith, Errors, Medicine and the Law, 72–97, 127–51 (2006) (discussing common reasons for medical negligence, suggesting that most medical errors are a result of a momentary lapse in attention). [↑](#footnote-ref-34)
34. Indeed, not every medical error is considered a result of negligence. *See*, *e*.*g*., Schueler v. Strelinger, 43 N.J. 330, 204 A.2d 577, 584 (1964) (“if the doctor has brought the requisite degree of care and skill to his patient, he is not liable simply because of failure to cure or for bad results that may follow. Nor in such case is he liable for an honest mistake in diagnosis or in judgment”). For a model of negligence that accommodates lapses in attention to the negligence inquiry, *see* Cooter & Ariel Porat, *Lapses of Attention in Medical Malpractice and Road* *Accidents*, 15 Theoretical Inq. L. 329, 348-50 (2014) (distinguishing between first-order precautions that affect the probability of an accident and second-order precautions that changes the probability distribution of the former acts). [↑](#footnote-ref-35)
35. This, of course, is the standard conception of the calculus of negligence, also known as the Learned Hand rule. *See,* U.S. v. Carroll Towing Co., 159 F. 2d 169 (1947); *see also*, Richard A. Posner, *A Theory of Negligence*, 1 J. Legal Stud. 29, 29–34 (1972). For an economic comparison of negligence and other liability regimes, *see* Guido Calabresi & Jon T. Hirschoff, *Towards a Test for Strict Liability in Torts*, 81 Yale L.J. 1055 (1972); Steven Shavell, *Strict Liability Versus Negligence*, 9 J. Legal Stud. 1 (1980); William M. Landes & Richard A. Posner, *The Positive Economic Theory of Tort Law*, 15 Ga. L. Rev. 851, 875-76, 905-12 (1981) [↑](#footnote-ref-36)
36. For an economic analysis of the standard of care, *see* Steven Shavell, Foundations of Economic Analysis of Law 180-9 (2004); Robert Cooter & Thomas Ulen, law & economics, 205-8, 211-17 (6th ed., 2016). [↑](#footnote-ref-37)
37. *See* C. A. Bond et al., *Medication Errors in United States Hospitals*, 21 Pharmacotherapy: J. Hum. Pharmacology & Drug Therapy 1023, 1031-32 (2001) (showing that the risk of medication errors increases substantially with workload); Jack Needleman et al., *Nurse-Staffing Levels and the Quality of Care in Hospitals*, 346 New Eng. J. Med. 1715, 1719-20 (2002) (patients receiving a higher proportion of hours of care per day had shorter lengths of stay and lower rates of complications); Pascale Carayon & Ayşe P. Gürses, *A Human Factors Engineering Conceptual Framework of Nursing Workload and Patient Safety in Intensive Care Units*, 21 Intensive & Critical Care Nursing 284, (2005) (showing that greater nursing workload, specifically in an ICU, is associated with adverse patient outcomes); Vicki Montgomery, *Effect of Fatigue, Workload, and Environment on Patient Safety in the Pediatric Intensive Care Unit*, 8 PediatricCritical Care Med. 11, 13-14 (2007) (accumulated evidence suggest that fatigue and excessive workload have a high potential to contribute to medical error in the pediatric intensive care unit); Neil D'Souza et al., *Modern Palliative Radiation Treatment: Do Complexity and Workload Contribute to Medical Errors?*, 84 Int’l J. Radiation Oncology–Biology–Physics 43, 46-8 (increasing workload and complexity directly impacts safety and accuracy of treatment.) [↑](#footnote-ref-38)
38. *See, e.g.*, Sigrid Veasey et al., *Sleep Loss and Fatigue in Residency Training: A Reappraisal*, 288 JAMA 1116, 1122-23 (2002) (analyzing studies on sleep deprivation and physician performance of surgical and nonsurgical residents, suggesting that sleep deprivation negatively affect performance in both groups over time); Teodor P. Grantcharov et al., *Laparoscopic Performance After One Night On Call in a Surgical Department: Prospective Study*, 323 BMJ 1222, 1223 (2001) (demonstrating higher complication rates, longer operative times, and higher error rate when procedures are performed after a night on call); Steven W. Lockley, *Effect of Reducing Interns' Weekly Work Hours on Sleep and Attentional Failures*, 351 New Eng. J. Med. 1829, 1835 (2004) (demonstrating that “[t]he acute and chronic sleep deprivation inherent in the traditional schedule caused a significant increase in attentional failures in interns working at night”); Peter Bartel et al., *Attention and Working Memory in Resident Anaesthetists After Night Duty: Group and Individual Effects*, 61 Occupational & Env’t Med. 167, 169-70 (2004) (associating performance deficits in anaesthetists residents with the frequency of night duty and hours of work per week). [↑](#footnote-ref-39)
39. Hospital’s negligence inquiry should also take into account investment in equipment. If different types of preventive measures are not independent, this further complicates the inquiry into the hospital’s conduct. [↑](#footnote-ref-40)
40. *See* Barry R. Furrow, *Enterprise Liability and Health Care Reform: Managing Care and Managing Risk*, 39 St. Louis U. L.J. 79, 109 (1994) (“The hospital is arguably in the best position to monitor conduct within its walls, to enforce adherence to policies, and to provide a source of compensation to injured patients”) [↑](#footnote-ref-41)
41. *See*, *e.g*.,Thompson v. Nason Hosp., 527 Pa. 330, 339 (1991) [↑](#footnote-ref-42)
42. In actions brought against hospitals for their direct liability (as opposed to vicarious liability), plaintiffs might claim that the hospital failed to acquire a medical device that could have reduced the risk of accidents. *See*, *e*.*g*., Washington v. Wash. Hosp. Ctr., 579 A.2d 177, 180 (D.C. 1990) (hospital was directly liable for failing to provide a device which allows early detection of insufficient oxygen in time to prevent brain injury). [↑](#footnote-ref-43)
43. A negligence regime creates optimal incentives for injurers to invest in care only when all the benefits and costs of the (untaken) precaution measures are considered. *See* Robert Cooter & Ariel Porat, *Does Risk to Oneself Increase the Care Owed to Others - Law and Economics in Conflict*, 29 J. Legal Stud. 19, 26 (2000) (Explaining that for the hand rule to create efficient incentives courts should consider every reduction in marginal risk including self-risk to the injurer); Ariel Porat, *Misalignments in Tort Law*, 121 Yale L. J. 82, 129-133 (2011) (“[e]fficiency would be achieved if the court, when setting the standard of care, were to take into account all risks that would have been reduced had precautions been taken.”). [↑](#footnote-ref-44)
44. *See* Giuseppe Dari-Mattiaci, *On the Optimal Scope of Negligence*, 1 Rev. L & Econ. 331 (2005) (argues that an increase the administrative costs of systems reduces the number of precautionary measures that courts will view as relevant for establishing negligence); Joshua C. Teitelbaum, *Computational Complexity and Tort Deterrence*, J. Legal Stud. (forthcoming, 2023) (explaining that when a choice set of precautionary measures is one dimensionaland convex, then optimal care is algorithmically tractable. However, when a choice set of precautionary measures is multidimensional and contains only discrete elements, optimal care is algorithmically intractable). [↑](#footnote-ref-45)
45. This strategy is famously exercised in cooperate law via the business judgment rule. In Smith v. Van Gorkom, 488 A.2d 858, 872 (Del. 1985), the Delaware Supreme Court held as a presumption that a firm's board of directors have met their duty of care, unless the plaintiff can prove that directors did not act on an informed basis or in honest belief that the action taken was in the best interests of the company. Hence, the rule focuses on the decision-making process instead of the decision to avoid discouraging profit maximizing decision from the fear of ex-post negligence determinations. *See, e.g.,* Kenneth B. Davis Jr., *Once More, the Business Judgment Rule*, 2000 Wis. L. Rev. 573 (2000) ([T]he focus is not on what the hypothetical reasonable director would have done but on what some rational director might have done… [I]t serves as an objective confirmation of the critical, but entirely subjective, requirement that the directors have a good faith belief that their decision is in the corporation's best interest.”) [↑](#footnote-ref-46)
46. *See* Dari-Mattiacci, *Supra* note 40, at 350-351 (Showing how an increase in administrative costs curbs the number of precautionary measures that courts will consider relevant for a finding of negligence. the optimal scope of negligence balances the advantages of a broader scope, in terms of better incentives, with its administrative costs). [↑](#footnote-ref-47)
47. There are risks associated with longer procedure time. For example, the risks from general anesthesia increase with time. Similarly, longer surgeries run a higher risk of surgical site infection and other complications. *See* *See, e.g.,* Eiko Imai et al., *Surgical Site Infection Risk Factors Identified By Multivariate Analysis for Patient Undergoing Laparoscopic, Open Colon, and Gastric Surgery*, 36 J. Infection Control 727 (identifying extended duration of surgery as an independent risk factor for surgical site infections.) [↑](#footnote-ref-48)
48. Removing certain measures and risks from the negligence inquiry reduces incentives to invest in these measures while simplifying the decision, meaning it requires less evidence and time to assign liability. [↑](#footnote-ref-49)
49. *See supra,* note **\_** and accompanying text. [↑](#footnote-ref-50)
50. *See* Steve Boccara, *Medical Malpractice*, *in* Tort Law and Economics 341, §12.4.4 (Michael Faure ed., 2009) (reviewing the law and economic literature on defensive medicine both from a theoretical and an empirical perspective); Mitchell Polinsky & Steven Shavell, *Punitive Damages: An Economic Analysis*, 111 Harv. L. Rev. 869, 879-80 (1998) (considering the case of excessive spending on precautions and defensive behaviors in cases where damages exceed harm); Ariel Porat, *Offsetting Risks*, 106 Mich. L. Rev. 243, 264 (2007) (“One of the most undesirable outcomes of medical malpractice liability is defensive medicine… When a doctor must choose between two courses of action and cannot be sure which one is more reasonable or which one a court will find reasonable in the event that the patient sues, he will choose the action that is the least risky for him.”) [↑](#footnote-ref-51)
51. *See* Sandro Vento, Francesca Cainelli &Alfredo Vallone, *Defensive medicine: It is time to finally slow down an epidemic*, 6 World J. Clin. Cases 406, 406 (2008). Most claims about the spread and the costs of defensive medicine are less reliable, as they are based on questionnaires. *See* Nicholas Summerton, *Positive and Negative Factors in Defensive Medicine: A Questionnaire Study of General Practitioners,* 310 *BMJ* 27 (1995) (98% of 300 practitioners that answered the survey reported some defensive practices). Since physicians have a skin in the game, there is always a fear that reports of defensive medicine are exaggerated. *See* Becker, *supra* note 28 (claiming that blaming tort law for the failings of the medical system is based on a myth, and that there are no convincing evidence of defensive medicine). [↑](#footnote-ref-52)
52. *See* Daniel Kessler & Mark McClellan, *Do Doctors Practice Defensive Medicine?*, 111 Quart. J. Econ. 353 (1996) (finding that malpractice reforms lead to reductions of 5 to 9 percent in medical expenditures without substantial effects on mortality or medical complications among elderly Medicare beneficiaries); Ronen Avraham & Max Schanzenbach, *The Impact of Tort Reform on Intensity of Treatment: Evidence from Heart Patients*, 39 J. Health Econ 278 (2015) (finding that caps on non-economic damages reduced the use of by-pass surgery among heart patients without affecting patient’s outcomes). *But see* Frank A. Sloan & John H. Shadle, *Is There Empirical Evidence for ‘Defensive Medicine’? A Reassessment*, 28 J. Health Econ. 481 (2009) (finding that tort reform did not affect medical expenses, nor did it affect patient outcome). [↑](#footnote-ref-53)
53. Amniocentesis test identifies many birth defects but carries a substantial cost and risk of complications, not the least of which is the risk of miscarriage. *See*, *e*.*g*., Ann Tabor & Zarko Alfirevic, *Update on procedure-related risks for prenatal diagnosis techniques*, 27 Fetal diagnosis & therapy 1 (2010) (review of the literature, showing the risk of a miscarriage following amniocentesis is 0.5-1%, and that this estimation is highly dependent on the physician’s experience. *C.f.,* Ryan A. Harris, et al., *Cost utility of prenatal diagnosis and the risk-based threshold*, 363 lancet 276 (2004) (claiming that the costs and risks of amniocentesis are exaggerated, and that the test should be offered to any expecting mother). For a case where physicians were found liable for not performing Amniocentesis, *see*, *e*.*g*., Jenkins v. Hosp. of the Med. Coll. of Pa., 401 Pa. Super. 604, 585 A.2d 1091 (1991) (allowing a mother’s wrongful birth cause of action, based on the physician’s failure to perform Amniocentesis test). There is empirical evidence that obstetricians prescribe excessive amniocentesis tests to avoid liability. *See* Beomsoo Kim, *The Impact of Malpractice Risk on the Use of Obstetrics Procedures*, 36 J. Legal. Stud. 79 (2007) (finding that amniocentesis, is responsive to the threat of tort, but that c-section and other tests are not). [↑](#footnote-ref-54)
54. Some evidence suggests that obstetrics over-recommend surgical delivery to reduce liability risk. *See* Joshua D. Dahlke et al., *Evidence-based Surgery for Cesarean Delivery: an Updated Systematic Review*, 209 Am. J. Obstetrics & Gynecology 308 (2013) (showing that the rate of cesarean delivery has increased dramatically since the 1990s, and that this increase is associated with an increase maternal morbidity and mortality). [↑](#footnote-ref-55)
55. For a general discussion on the effects of evidentiary concerns on primary behavior, *see* Gideon Parchomovsky & Alex Stein, *The Distortionary Effect of Evidence on Primary Behavior*, 124 Harv. L. Rev. 518, 524-28 (2010) (maintaining that “[e]ach actor has a strong incentive to behave in a way that generates evidence favorable to her case in court. This evidentiary motivation will often undermine substantive law's efforts to minimize harm at the lowest possible cost.”); Michael S. Pardo, *Some Remarks on the Importance of Evidence outside of Trials*, 36 Rev. Litig. 443, 466-47 (2016) (same). [↑](#footnote-ref-56)
56. For a case where plaintiff alleges the physician failed to take adequate care measures, resulting in the patient’s body falling from the table during surgery, *See* Locklear v. Cummings, 262 N.C. App. 588 (2018). [↑](#footnote-ref-57)
57. *See* Aaron Lazare, The Healing Forces or Apology in Medical Practice and Beyond, 57 DePaul L. Rev. 251(2007) [↑](#footnote-ref-58)
58. *See* Michelle M Mello & Troyen A. Brennan, *Deterrence of Medical Errors: Theory and Evidence for Malpractice Reform*, 80 Texas L. Rev. 1595, 1602 (2002) (claiming that while public health authorities try to use formal reporting systems to gather information about errors and increase patient’s safety, hospitals and practitioners object such efforts due to fear that such reports are not insulated from legal discovery during medical malpractice proceedings). [↑](#footnote-ref-59)
59. Federal rules of evidence prohibit plaintiffs from presenting evidence of actions the defendant took after the accident to prevent similar accidents as proving fault. *See* Fed. R. Evid. 407 (“When measures are taken that would have made an earlier injury or harm less likely to occur, evidence of the subsequent measures is not admissible to prove: negligence…”). [↑](#footnote-ref-60)
60. Communication between physicians, especially in patient hand-offs (transfers between units and shifts) is ICU, preoperative care and emergency units is strongly connected to patient safety. The risk of errors due to miscommunication can be ameliorated by implementing EHR. *See* Martin Muller, et al., *Impact of the Communication and Patient Hand-off Tool SBAR on Patient Safety: A Systematic Review*, 8 BMJ Open 1 (2018) (metanalysis of several studies found evidence that a communicational tool helped improve patient outcomes). [↑](#footnote-ref-61)
61. *See*, *e.g.*, Mohamed Ramadan & Khalid Al-Saleh, *Development of an Expert System for Reducing Medical Errors*, 4 Int’l J. Software Engineering & Applications 29 (2013) (describing a method for developing a support system that should reduce medical errors). [↑](#footnote-ref-62)
62. Thomas R. McLean, et al., *Electronic Medical Record Metadata: Uses and Liability*, 206 J. Am. C. Surgeons 405 (2008) [↑](#footnote-ref-63)
63. *See* Makary & Daniel, *supra* note 27 (noting that “[c]currently, deaths caused by errors are unmeasured and discussions about prevention occur in limited and confidential forums” and that “[t]hese e forums review only a fraction of detected adverse events and the lessons learnt are not disseminated beyond the institution or department.”). [↑](#footnote-ref-64)
64. *See* Joachim Meyer & Omer Pelled, *The Risks of Collecting Medical Data in a Litigious Society: Lessons from ICU Monitor Alarms*, (unpublished manuscript, on file with author) (Showing that recording certain data might have an unwarranted side effect, by incentivizing staff to focus more on their recorded actions than on unrecorded ones). [↑](#footnote-ref-65)
65. For a discussion on the constitutionality of laws barring healthcare provider’s apologetic statements as evidence of fault, *see* Coleman v. Amon, 498 P.3d 638, 642-644 (Ariz. Ct. App. 2021) (decided that Arizona’s apology law is not unconstitutional, as it serves a legitimate interest of encouraging healthcare providers to be more empathetic and candid with patients). some argue that apology laws reduce patients’ incentive to sue and thus reduce liability risk, similar to other tort reforms. *See* Yonathan Arbel & Yotam Kaplan, *Tort Reform through the Back Door: A Critique of Law and Apologies*, 90 S. Cal. L. Rev. 1199 (2016) (arguing that apology laws should be viewed as further attempts to reduce medical malpractice liability, similar to other reforms). However, some evidence suggests that apology laws do not reduce the frequency of lawsuits or payments against surgeons and increase both for nonsurgeons. *See* Benjamin J. McMichael, R. Lawrence van Horn & W. Kip Viscusi, *Sorry Is Never Enough: How State Apology Laws Fail to Reduce Medical Malpractice Liability Risk*, 71 Stan. L. Rev. 341 (2019). [↑](#footnote-ref-66)
66. *See supra,* note 56. [↑](#footnote-ref-67)
67. We assume that some physicians will still apologize share information about errors, even if such statements are admissible. If that is not the case, making these statements inadmissible as evidence will not affect deterrence. [↑](#footnote-ref-68)
68. For a discussion on administrative cost as part of the costs of accidents that should be minimized, *see* Guido Calabresi, The Costs of Accidents, 26-31, 286-287 (1971). [↑](#footnote-ref-69)
69. Black et al., *supra* note 29 at 105-107 (showing that it costs more than 1$ in overhead to pay 1$ of compensation to the victim). [↑](#footnote-ref-70)
70. *Id*., at 21-2 (increase in costs are correlated with a drop in claims of lower monetary value claims). [↑](#footnote-ref-71)
71. Philip Peters, *Twenty Years of Evidence on the Outcomes of Malpractice Claims*, 467 Clinical Orthopedic related res. 352 (2009) (showing that while physicians win 80%-90% of cases deemed weak by other physicians, they lose only 50% of the cases that other physicians believe show strong evidence of negligence). However, the more significant source of under-enforcement goes back to the patient’s decision to file a claim. Most victims of negligent medical errors do not file a claim and receive no compensation. *See* Russell A. Localio, et al., *Relation between Malpractice Claims and Adverse Events Due to Negligence*, 325 New Eng. J. Med. 245 (1992) (showing that only a small fraction of adverse events due to negligence were followed by claims of medical malpractice). [↑](#footnote-ref-72)
72. *See, e*.*g*., Judy Donlen & Janet Spicer Puro, *The impact of the medical malpractice crisis on OB-GYNs and patients in southern New Jersey*, 100 N. J. Med. 12 (2003) (claiming that the medical malpractice crisis created an insurance affordability problem). [↑](#footnote-ref-73)
73. *See* Peters, *supra* note 68, at 352 (“malpractice outcomes bear a surprisingly good correlation with the quality of care as judged by other physicians.”). [↑](#footnote-ref-74)
74. Real defense costs have risen substantially over the years, and more than doubled since the 80’s (in real costs). Furthermore, payouts, changes in hourly legal fees and litigation time do not account for this increase in defense costs. *See* Black et al., *supra* note 29, at 89-104 (showing that defense costs increased between 1988 to 2005 in all personal injury cases, but in medical malpractice cases the increase was more rapid, rising almost four times higher) [↑](#footnote-ref-75)
75. *See, e*.*g*., John H. Chi, *Neurosurgery Tops Malpractice Risk*, 69 Neurosurgery n18 (2011) (neurosurgeons were the most likely to be sued, but not the most likely to pay damages following a malpractice claim). [↑](#footnote-ref-76)
76. *See* Donlen & Puro, *supra* note 69 (claiming that insurance affordability problems lead to limited access for patients). [↑](#footnote-ref-77)
77. Low expected compensation also affects the efficacy of the current medical malpractice law as a deterrent. To create efficient incentives, all negligent treatment victims must be fully compensated. Tortfeasors who know that they will have to pay less in compensation, on average, than the harm they caused, are underdeterred. *See* Polinsky & Shavell, *supra* note 47, at 888-89 (explaining that when a tortfeasors know that on average they will have to pay in damages less that the actual harm caused, then they will have an inadequate incentive to take the precaution, because the precaution cost will exceed his average liability cost). [↑](#footnote-ref-78)
78. *See* Black et al., *supra* note 29, at 73 (“… about 97 percent of the paid claims in our dataset are in cases that are settled prior to a verdict”). [↑](#footnote-ref-79)
79. *See* Localio, et al., *supra* note 68 (showing that only a small fraction of adverse events due to negligence were followed by claims of medical malpractice). [↑](#footnote-ref-80)
80. *See* Black et al., *supra* note 29, at 55-66 (2021) (showing that doctors rarely pay the full awarded compensation). [↑](#footnote-ref-81)
81. *Supra* part 2.2. [↑](#footnote-ref-82)
82. *See* Ronen Avraham and John M. Golden, *“From PI to IP”: Litigation Response to Tort Reform*, 20 Am. L. & Econ. Rev. 168 (2018) (suggesting that one potential side-effect of tort reform is migration of in-state plaintiff’sattorney’s lawyers to IP, since caps on damages limit their fees, and their willingness to take on medical malpractice cases and their litigation costs); Black et al., *supra* note 29, at 195 (noting that some reforms ae designed to make medical malpractice lawsuits more costly and less remunerative, explaining the drop in cases in general and small claims in particular). [↑](#footnote-ref-83)
83. *See* Polinsky & Shavell, *supra* note 47, at 888 (1998) (claiming that if injurers sometimes escape liability for harm they negligently cause due to informational challenges then they will have inadequate incentives to invest in care and their incentive to participate in risky activities will be excessive). [↑](#footnote-ref-84)
84. For a discussion on the disincentive to inform patients of medical errors, *see* *supra*, part 2.1.2 [↑](#footnote-ref-85)
85. *See, e.g.,* [Saks v. Ng, 890 A.2d 983 (N.J. Super. 2006)](https://advance.lexis.com/api/document/collection/cases/id/4J78-YRF0-0039-44H4-00000-00?cite=890%20A.2d%20983&context=1000516) (After a doctor tried to surgically repair a retinal tear in the patient’s eye, the patient permanently lost vision in that eye. The court held that since the defendant followed one of two reasonable methods of anesthesia, he should not be held liable); [Shectman v. Bransfield, 959 A.2d 278 (N.J. Super. 2008)](https://advance.lexis.com/api/document/collection/cases/id/4TX8-6DC0-TXFV-F326-00000-00?cite=403%20N.J.%20Super.%20487&context=1000516) (Plaintiff alleged defendant psychiatrist’s malpractice resulted in his suicide attempt. The Superior Court of New Jersey noted and instructed that jury that there were two generally accepted and reasonable courses of treatment that could have been employed the choice between the two was a under the scope of the psychiatrist’s reasonable judgment). [↑](#footnote-ref-86)
86. *See, e.g.*, [Merrell Dow Pharm., Inc. v. Havner, 953 S.W.2d 706 (Tex. Sup. J. 1997)](https://advance.lexis.com/api/document/collection/cases/id/3T82-3PC0-0039-4049-00000-00?cite=953%20S.W.2d%20706&context=1000516) (in a mass tort case, parents claim that pharmaceutical company’s drug caused birth defects. Texas Supreme Court denied compensation, because plaintiffs failed to prove that the defendant’s drug increased the risk of such birth defects by more than 50percent); *See also* Maytal Gilboa, *Multiple Reasonable Behaviors Cases: The Problem of Causal Underdetermination in Tort Law*, 25 Leg 77 (2019) (explaining why the problem of causal underdetermination was overlooked by tort scholars and is perceived by courts as lack of causation). [↑](#footnote-ref-87)
87. This is in accordance with the preponderance of the evidence rule. *See* Dumas v. Cooney, 235 Cal. App. 3d 1593, 1611 (1991) (stating that California prefers the established rule of tort law causation, denying compensation for loss of chance). [↑](#footnote-ref-88)
88. For further discussion concerning the acceptance of lost chance of recovery doctrine, see, e.g., Alice Ferot, T*he Theory of Loss of Chance: Between Reticence and Acceptance*, 8 Fiu. L. Rev. 591 (2013); Matthew Wurdeman, *Loss-of-Chance Doctrine in Washington: From Herskovits to Mohr and the Need for Clarification*, 89 Wash. L. Rev. 603 (2014). [↑](#footnote-ref-89)
89. *See* Leonard Berlin, *Medical Errors, Malpractice, and Defensive Medicine: an Ill-Fated Triad*, 4 Diagnosis 133, 137 (2017) (arguing that defensive medicine became a part of medical culture and education so while defensive medicine was a response to an increase in liability risk, these practices are unlikely to decrease as litigation risk decreases). [↑](#footnote-ref-90)
90. *See, e.g.,* Irene Papanicolas et al., *Health Care Spending in the United States and Other High-Income Countries*, 319 JAMA 1024 (finding that the United States spent in 2016 nearly twice as much as 10 high-income countries on medical care, and performed less well on many population health outcomes). [↑](#footnote-ref-91)
91. *Id*. *See also* Luca Lorenzoni el al*., Health-Care Expenditure and Health Policy in the USA Versus Other High-Spending OECD Countries*, 384 Lancet 83, 89 (2014) (“The USA is an outlier in the scenery of OECD health-care systems, for its staggering levels of expenditure, the extent of fragmentation of its system and the sheer complexity of its administration, the power of vested interests, and the large number of people left without adequate health insurance coverage.”). [↑](#footnote-ref-92)
92. *See supra,* note \_ and accompanying text. [↑](#footnote-ref-93)
93. *See* Louis Kaplow & Steven Shavell, *Accuracy in the Assessment of Damages*, 39 J.L. & ECON. 191, 192-93 (1996) (arguing that when injurers lack information concerning level of harm, setting damages equal to the average level of harm, is more efficient than an accurate assessment of harm). [↑](#footnote-ref-94)
94. *See supra,* note 19 and accompanying text. [↑](#footnote-ref-95)
95. *See* Shavell, *supra* note 31, at 2 (“By definition, under the negligence rule all that an injurer needs to do to avoid the possibility of liability is to make sure to exercise due care if he engages in his activity. Consequently he will not be motivated to consider the effect on accident losses of his choice of whether to engage in his activity or, more generally, of the level at which to engage in his activity”); Steven Shavell, Foundations of Economic Analysis of Law, 197-99 (2004) (same); *see also* Restatement (Third) of Torts: Liab. for Physical & Emotional Harm, § 3 at para. H (2010). [↑](#footnote-ref-96)
96. Chun Kevin Yang et al., *Pulmonary Complications after Major Abdominal Surgery: National Surgical Quality Improvement Program Analysis*, 198 J. Surgical Rsch. 441 (2015) (finding that pulmonary complications after an abdominal surgery depends on patient characteristics such as age, gender, and smoking). [↑](#footnote-ref-97)
97. The victims that suffered harm are not chosen in random, as those with higher risk are more likely to be represented than those with a lower risk. [↑](#footnote-ref-98)
98. Nevertheless, the problem may persist if some risk factors are non-verifiable. If a surgeon can estimate that a patient is at higher risk than what can be estimated based on the patient’s known characteristics, hospitals might still try to reduce liability be turning down these patients. [↑](#footnote-ref-99)
99. The problem persists if we allow victims to opt-out of SLUH litigation. David Rosenberg made a similar observation, discussing class action litigation of mass torts. *See* David Rosenberg, *Mandatory-Litigation Class Action: The Only Option for Mass Tort Cases*, 115 Harv. L. Rev. 831 (2002) (arguing that *ex ante* potential victims prefer collective litigation but after learning of their individual harm, some victims prefer individual litigation, thwarting efforts to achieve optimal deterrence). [↑](#footnote-ref-100)
100. In most countries that adopted class action litigation it is designed as an opt-out mechanism, meaning that all members of a group holding similar claims are assumed to be part of the litigation unless they opt-out. *See* John E. Kennedy, *Class Actions: The Right to Opt Out*, 25 Ariz. L. Rev. 3 (1983) (tracing the historical development of the right to opt-out and offers alternatives). In practice it is rare that members of the group opt-out of the litigation. However, for SLUH to work it is important that compensation to all victims will be adjudicated together, or at least the harm to the victim who opted-out will be considered as part of the actual harm, even If that victim is not entitled to compensation as part of the collective litigation. If SLUH replaces the current medical malpractice regime, then group members will have no incentive to opt-out, since they cannot sue for negligence and receive more compensation. [↑](#footnote-ref-101)
101. These risks mirror the risks of errors in setting the due care standard and in assessing the injurer’s conduct. *See* Thomas J. Miceli, Economics of the law: torts, contracts, property, and litigation, 45–46 (1997) (discusses the effects of uncertainty over the determination of fault, showing it may cause over or underdeterrence); Steven Shavell, Foundations of Economic Analysis of Law 224–228 (2004) (showing that uncertainty about the determination of the standard of care causes overdeterrence); Mark F. Grady, *A New Positive Economic Theory of Negligence*, 92 Yale L. J. 799, 806-813 (1983) (uncertainty regarding the standard causes overinvestment in care when causation does not limit liability while uncertainty when the causation requirement limits liability causes underinvestment); Richard Craswell & John E. Calfee, *Deterrence and uncertain legal standards*, 2 J. L. Econ. & Org. 279, 283-287 (1986) (showing that uncertain standards may cause overdeterrence or underdeterrence, depending on the mean and standard deviation of the error function).; Omer Y. Pelled, *All-or-Nothing, or Something – Proportional Liability in Private Law*, 22 Theoretical Inq. L. 159, 178-84 (2021) (classifying uncertainty regarding fault as a particular case of unilateral uncertainty, showing that in any case of unilateral uncertainty may result in over or underdeterrence). [↑](#footnote-ref-102)
102. Compensation is generally restricted to positive values, so whenever the injurer’s conduct can stochastically result in positive and negative externalities restricting compensation to positive values may distort the incentives. *See* Urs Schweizer, *But-for Causation and the Implementability of Compensatory Damages Rules*, 36 J. L. Econ. & org. 231, 247(2020) (showing that correctly applying the causation requirement leads to efficient equilibrium even when the standard of care is not set efficiently, but only if negative damages are allowed); Zhiyoung Liu, Ronen Avraham & Yue Qiao, *Unrequested Benefits, Damages Assessment, and Information Acquisition*, 23 Am. L. & Econ. Rev. 207 (2021) (investigating the interaction between the prohibition on recovery for unrequested benefits with the incentives to acquire information when an activity potentially creates both negative and positive externalities). [↑](#footnote-ref-103)
103. This assumes that there are no other costs to liability, such as reputational costs. For the effect of such costs on optimal damages calculations, *see* Robert Cooter & Ariel Porat, *Should Courts Deduct Nonlegal Sanctions from Damages?*, 30 J. Legal Stud. 401 (2001) (discussing how nonlegal sanctions affect deterrence and suggesting when it is suitable to deduct the value of these sanctions from damages). [↑](#footnote-ref-104)
104. *See supra,* note 31 and accompanying text. [↑](#footnote-ref-105)
105. *See* David Gilo & Ehud Guttel, *Negligence and Insufficient Activity: The Missing Paradigm in Torts*, 108 Mich. L. Rev. 277, 319 (2009) (suggest subsidizing activity to correct otherwise distorted incentives). [↑](#footnote-ref-106)
106. Mathematically, the result is unsurprising. When negative damages are allowed SLUH is identical to strict liability regime, minus a fixed sum, equal to the courts assessment of reasonable harm. Since the fixed sum is unaffected by the hospital’s actions, it does not distort the hospital’s incentives. [↑](#footnote-ref-107)
107. The class of victims in SLUH litigation is not strictly a sample, since it involves everyone who was injured. The use of a sample, i.e., examining a randomized sub-group, was used in class action litigation to prove the cause of action of the entire class. *See* Hillel J. Bavli, *Aggregating for Accuracy: A Closer Look at Sampling and Accuracy in Class Action Litigation,* 14 L. PROBABILITY and RISK 67, 70-73 (2015) (discussing the use of sampling as means of increasing accuracy in class action litigation) [↑](#footnote-ref-108)
108. This variation can be statistically estimated by the standard error of the sample mean, which is affected by the sample size. [↑](#footnote-ref-109)
109. Statistically, experts can assess the standard error of the expected harm, given the number of patients the hospital treated, and set the reasonable level of harm to make sure that the probability that the harm will be below the reasonable level given reasonable care is very low. [↑](#footnote-ref-110)
110. I.e., given the Central Limit Theorem, sample size is negatively correlated with the standard error of a sample. Hence, as the sample size gets larger, the mean of the distribution is closer to the population mean. *See generally* Alan Agresti & Barbara Finlay, Statistical Methods for the Social Sciences 88-94 (5th ed. 2018). [↑](#footnote-ref-111)
111. *See* Hillis et al., *supra* note 16, at § 5.1(finding that “the common denominator among successful performance improvement strategies is the implementation of a formal quality assessment and feedback program benchmarked against regional or national results.”). [↑](#footnote-ref-112)
112. *Id*. (noting that these datasets where developed “[t]o address the need for valid and reliable risk-adjusted outcomes data…”). [↑](#footnote-ref-113)
113. *See* Mark E. Cohen et al., *Improved Surgical Outcomes for ACS-NSQIP Hospitals Over Time*, 362 Annals of Surgery 267 (2016) (describing the methodology of data collection in CAN-NSQIP and show that participating in the program led to a reduction in postoperative complications). [↑](#footnote-ref-114)
114. The ACS-NSQIP surgical risk calculator is available at <https://riskcalculator.facs.org/RiskCalculator/> (last visited Sept. 1, 2022) [↑](#footnote-ref-115)
115. *Id*. (The risk calculator uses 20 patient predictors and the planned procedure to predict the chance that patients will have any of 18 different outcomes, one of which is surgical site infection). [↑](#footnote-ref-116)
116. *See* Parchomovsky & Stein, *supra* note 52, at 538 (arguing that “[i]ndependently of the chosen liability standard, doctors will continue to generate evidence demonstrating that they went beyond the call of duty and took extra measures to protect the health of their patients.”). [↑](#footnote-ref-117)
117. *See* Restatement (Third) of Torts, *supra* note 92, at §29 (“an actor's liability is limited to those harms that result from the risks that made the actor's conduct tortious.”). [↑](#footnote-ref-118)
118. *See* Teitelbaum, *supra* note 40, at §4 (showing that when optimal care is algorithmically intractable, searching for more efficient precautions involves learning-by-experimentation). [↑](#footnote-ref-119)
119. Some hospitals serve certain types of patients. For example, veterans health facilities cater to a very specific type of patients (veterans), who might have different risks of complications (given reasonable care) than other patients. As long as these patient-related risks, however, are already a part of the risk-adjusted reasonable harm assessment, the fact that the medical facility treats veterans should not be further taken into account. [↑](#footnote-ref-120)
120. See, e.g., Moschini et al., Critical Review of Outcomes from Radical Cystectomy: Can Complications from Radical Cystectomy Be Reduced by Surgical Volume and Robot Surgery?, 2 Euro. Urology Focus 19 (2016) (finding correlation between hospital volume and patient outcomes and complications). [↑](#footnote-ref-121)
121. A similar discussion has been raised concerning the personalization of the standard of care under negligence. *See* Omri Ben-Shahar & Ariel Porat, *Personalizing Negligence Law*, 91 N.Y.U. L. Rev. 627 (2016) (suggesting that court would set a personalized standard of care for each injurer, based on the injurer’s characteristics). [↑](#footnote-ref-122)
122. *See* Cohen et al., *supra* note 110 and accompanying text. [↑](#footnote-ref-123)
123. Steven M Steinberg, et al., *Comparison of risk adjustment methodologies in surgical quality improvement*, 144 Surgery 662 (2008) (finding that ACS-NSQIP identified 61 percent more complications than UHC, including 97 percent more surgical site infections than a similar program that is claims data). [↑](#footnote-ref-124)
124. For a Study suggesting that post-discharge interviews can reveal preventable events which were not documented in patient’s records, *See* Joel S. Weissmanet al., *Comparing Patient-Reported Hospital Adverse Events with Medical Record Review: Do Patients Know Something That Hospitals Do Not?*, 149 Annals Internal Medicine 100 (2008). [↑](#footnote-ref-125)
125. For an extensive examination of the challenges the medical malpractice system, as well as critical analysis of the effects of tort reforms on outcomes and medical costs, *see* generally Black et al., *supra* note 29. [↑](#footnote-ref-126)
126. *Id*, at 111-21 (reviewing the use of capping non-economic damages in Texas); *see also* Avraham & Schanzenbach, *supra* note 49. [↑](#footnote-ref-127)
127. *See* Arbel & Kaplan, supra note 62, at 1201 (maintaining that apology laws are structured as "de facto tort reform.”); W. Kip Viscusi, *Medical Malpractice Reform: What Works and What Doesn't*, 96 Denv. L. Rev. 775 (2019) (same). [↑](#footnote-ref-128)
128. *See supra,* part 2.1. [↑](#footnote-ref-129)
129. *See supra*, part 2.2; Black et al., *supra* note 66, at 168-70 (showing that while tort reform in Texas during 2003 did limit physicians’ exposure to liability, it had little effect on improving access to care for patients). [↑](#footnote-ref-130)
130. *See supra,* part 2.3. [↑](#footnote-ref-131)
131. *See* Yuval Bitan, et al., *Nurses’ reactions to alarms in a neonatal intensive care unit*, 6 Cognition, Tech. & Work, 239 (2004) (shows that nurses prioritize responses to alarms, treating patients in need quickly but ignoring alarms to focus on other tasks when these alarms are not likely to have medical significance). [↑](#footnote-ref-132)
132. *See, e*.*g*., Sandra Petronio et al., *Disclosing medical mistakes: a communication management plan for physicians*, 17 Permanente J. 73 (2013) (despite a consensus that disclosure of medical error is ethically and legally appropriate, concern about medical malpractice suits, among other concerns, make disclosure difficult). [↑](#footnote-ref-133)
133. *See, e*.*g*., Tsachi Keren-Paz, *Liability Regimes, Reputation Loss, and Defensive Medicine*, 18 Medical L. Rev. 363 (2010) (analyzing the effects of negligence and strict liability on physicians’ reputation). [↑](#footnote-ref-134)
134. *See, e*.*g*., Angela M. Ingraham, et al., *Comparison of outcomes after laparoscopic versus open appendectomy for acute appendicitis at 222 ACS NSQIP hospitals*, 148 Surgery 625 (2010) (analyzing data of 32,683 appendectomy patients from 222 participating hospitals to find the relative risk of different approaches given patients’ characteristics) ‏ [↑](#footnote-ref-135)
135. *See, e*.*g*., Hadiza S. Kazaure, Sanziana A. Roman & Julie A. Sosa, *The resident as surgeon: an analysis of ACS-NSQIP*, 178 j. surgical res. 126 (2012) (analyzing data of patient outcomes based on whether the operation was conduced by resident, a resident guided by an attending, or attending operating alone found that residents ad longer operating time, but selection of surgeries to residents and supervision prevented compromising patient outcome for medical education). [↑](#footnote-ref-136)
136. *See, e*.*g*., Hadiza S. Kazaure, et al., *Cardiac Arrest Among Surgical Patients: An Analysis of Incidence, Patient Characteristics, and Outcomes in ACS-NSQIP*, 148 JAMA Surgery 14 (2013) (analyzing data of 6,382 patients who underwent CPR following surgery to find risk factors to and from postoperative heart failure). [↑](#footnote-ref-137)
137. *Supra* part 2.2 [↑](#footnote-ref-138)
138. Hospital enterprise liability was considered as a way to reduce these costs by making the hospital the sole defendant in each case involving care inside a hospital. [↑](#footnote-ref-139)
139. *See supra,* note 83-85 and accompanying text. [↑](#footnote-ref-140)
140. *See supra,* note 66-67 and accompanying text. [↑](#footnote-ref-141)
141. *See supra,* note 68, 75-76 and accompanying text. [↑](#footnote-ref-142)
142. Ernest J. Weinrib, *The Gains and Losses of Corrective Justice*, 44 Duke L.J. 277, 283 (1994) (distinguishing between material loss and normative loss, and stating that “if you injure me nontortiously, the loss I suffer falls under the material conception, but because you have breached no norm, the normative conception of norm is inapplicable”) [↑](#footnote-ref-143)
143. *Id*, at 290 (“one cannot justify tort liability by reference to the need both to deter actors and to compensate sufferers. To be sure, such a combination produces a normative gain for the defendant and a normative loss for the plaintiff. But because the reason for thinking the defendant to have gained is not the same as the reason for thinking the plaintiff to have lost, the gain and the loss are not normatively correlative.”); *see also* Ernest J. Weinrib, The Idea of Private Law 157 (2012) (“Corrective justice requires not factual but normative loss consisting in wrongful infringement of the plaintiff ’s right.”). [↑](#footnote-ref-144)
144. *See supra*, Part ‎2.1. [↑](#footnote-ref-145)
145. *See* David Rosenberg, *Individual Justice and Collectivizing Risk-Based Claims in Mass-Exposure Cases*, 71 N.Y.U. L. Rev. 210, 246 n.90 (1996) (noting that risk-averse individuals “would, of course, prefer an averaging rule that conformed to the insurance model as against the standard, all-or-nothing rule that, depending on the fortuitous availability of a preponderance of evidence showing specific causation, awards the individual claimant 100% of the loss or nothing.”); *See generally* Steven Shavell, Economic Analysis of Accident Law 186-87 (1987) (explaining that as opposed to risk-neutral parties, risk-averse parties “care not only about the expected value of losses, but also about the possible magnitude of losses.”). [↑](#footnote-ref-146)
146. Patients (and their medical insurers) might even prefer negligent physicians over reasonable ones because of the insurance received alongside negligent care. For an analysis suggesting that victims might induce injurers to act negligently, *see* Alon Cohen, Avraham Tabbach & Ariel Porat, *Inducing Negligence* (unpublished manuscript, on file with author). [↑](#footnote-ref-147)
147. *See* *supra*, note 68 and accompanying text. [↑](#footnote-ref-148)
148. One might argue that corrective justice is only concerned with those patients who file a claim, since an important aspect of the right to autonomy is the person’s right to decide if to enforce. [↑](#footnote-ref-149)
149. *See* Ariel Porat, *Private Production of Public Goods: Liability for Unrequested Benefits*, 108 Mich. L. Rev. 189, 190-91 (2009) (reviewing the different legal treatment of negative and positive externalities, and proposing an "expanded duty of restitution, under which, when certain conditions are met, recipients would compensate benefactors for unrequested benefits.”) *see also* Giuseppe Dari-Mattiacci, *Negative Liability*, 38 J. Legal Stud. 21, 22-23 (2009) (“In general, positive-externality problems are commonly regarded as a justification for public goods provision, subsidies, or regulation rather than for liability.”). [↑](#footnote-ref-150)
150. *See* Andis Robeznieks, *Wary physicians*, 35 Mod. Healthcare 8 (2005) (finding that defensive clinical practices lead to a high degree of avoidance of treating risky patients); John Adwok & Ellen Hope Kearns, Defensive Medicine: Effect On Costs, Quality & Access to Healthcare, 3 J. Biology, Agric. & Healthcare 29, 31 (2013) (“Perhaps the practice of over investigating patients provides an element of protection for the doctor and a marginal benefit for the patient, but the overwhelming evidence suggests it increases the cost of care and may increase patient risk.”); WT Oosthuizen & PA Carstens, *Medical Malpractice: The Extent, Consequences and Causes of the Problem*, 78 Thrhr 269, 277 (2015) (arguing that “increased liability costs are eventually passed on to the patient in the form of more expensive healthcare services.”). [↑](#footnote-ref-151)
151. In Medical Malpractice cases, proving causation is inherently difficult since patients require medical treatment because of some inherent risk. Some jurisdictions allow for proportional liability under the loss of chance to recovery doctrines. *See*, e.g., Herskovits v. Group Health Coop. of Puget Sound, 664 P.2d 474, 476-77 (The ultimate question raised here is whether the relationship between the increased risk of harm and Herskovits' death is sufficient to hold Group Health responsible. Is a 36 percent (from 39 percent to 25 percent) reduction in the decedent's chance for survival sufficient evidence of causation… We answer in the affirmative.”); for further discussion, *see* Porat, *supra* note 39, at 110-11. [↑](#footnote-ref-152)
152. *See supra*, Part ‎3.1. [↑](#footnote-ref-153)
153. *See* Steven Shavell, *Uncertainty over Causation and the Determination of Civil Liability*, 28 J.L. & Econ. 587, 589 (1985) (stating that whenever there is uncertainty over causation, liability in proportion to the probability of causation is creates better incentives than any threshold criterion); John Makdisi, *Proportional Liability: A Comprehensive Rule to Apportion Tort Damages Based on Probability*, 67 N.C. L. Rev. 1063, 1067-75 (1989) (claiming that proportional liability promotes both efficient incentives and corrective justice principles) ; Porat, *supra* note 39, at 108-14 (2011) (same); Pelled, *supra* note 98, at 173-178 (arguing that uncertainty over causation should be treated the same as uncertainty regarding the level of harm, and allow for proportional liability). [↑](#footnote-ref-154)
154. *See* Polinsky & Shavell, *supra* note 47, at 888 (discussing different general reasons that “injurers sometimes escape liability for harms for which they should be liable.”). [↑](#footnote-ref-155)
155. *See, e.g.,* Prentis v. Yale Mfg. Co., 365 N.W.2d 176, 184 (Mich. 1984) (the court explained that "in a design defect case, the issue is whether the manufacturer properly weighed the alternatives and evaluated the trade-offs and thereby developed a reasonably safe product…[t]he risk-utility balancing test is merely a detailed version of Judge Learned Hand's negligence calculus."); Castro v. QVC Network, 139 F.3d 114, 116 n.3 (2d Cir. 1998) (holding that the risk-utility calculus in product liability cases "is in many ways similar to the Learned Hand negligence test"); Liriano v. Hobart Corp., 132 F.3d 124, 131 n.12 (2d Cir. 1998) (The risk-utility test involves the making of a cost-benefit analysis to gauge the benefits of a product in relation to its dangers. In this respect, it is very similar to the Learned Hand cost-benefit analysis undertaken to determine whether negligence exists). [↑](#footnote-ref-156)
156. *See, e.g.,* Blair v. Eagle-Picher Indus., Inc., 962 F.2d 1492, 1495 (10th Cir. 1992) ("[i]n order for a plaintiff in Oklahoma to prevail in a products liability action such as this one, the plaintiff must first prove that the defendant's product actually caused the injury. The mere possibility that the product caused the injury is not enough."); Cole v. Janssen Pharm., Inc., 759 F. App'x 518, 519 (7th Cir. 2019) (holding that in product liability cases, a plaintiff has the burden of proving that a defective product is a legal cause of an injury, so the plaintiff must show that the defect in the product was a 'cause in fact' of the injury). [↑](#footnote-ref-157)
157. *See* *supra*, note 2. [↑](#footnote-ref-158)
158. Alice Guerra, Francesco Parisi & Daniel Pi, *Liability for Robots I: Legal Challenges*, 18 J. Institutional Econ. 331 (2022) (describing the challenges of attributing fault to an A.I. device). [↑](#footnote-ref-159)
159. Suhrid A. Wadekar, *Autonomous Vehicles: As Machines Learn to Drive, What Must We Learn?*, 27 B.U. J. Sci. & Tech. L. 345, 361 (2021) (noting that “even if functionality testing shows that the AV Software would behave as specified, that in itself would generally not provide adequate assurance about the safety of the AV.”); Rick Salay & Krzysztof Czarnecki, *Using Machine Learning Safely in Automotive Software: An Assessment and Adaption of Software Process Requirements in ISO 26262*, ArXiv abs/1808.01614, 7 (2018) (explaining that autonomous driving requires perception of the environment, and this functionality may not be completely specifiable. Since a vehicle must move around in a human world, advanced functionality must involve perception of human categories, such as pedestrians. There is evidence that such categories can only partially be specified using necessary and sufficient conditions). [↑](#footnote-ref-160)
160. For the restatement’s definition of defect in design, *see* Restatement (Third) of Torts: Prod. Liab. § 2 (1998) (“[a product] is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the alternative design renders the product not reasonably safe.”). [↑](#footnote-ref-161)
161. Theoretically, it is possible to use strict liability for all A.I. devices, regardless of defects. Strict liability, however, may stifle innovation and create entry barriers, harming competition between manufacturers. *See* Yavar Bathaee, *The Artificial Intelligence Black Box and the Failure of Intent and Causation,* 31 Harv. J. L. & Tech. 899 (2018). The fear is that manufacturers will have adequate incentives to reduce risk given available technology, but they will not invest enough in developing new, safer technologies, increasing accident costs in the long run. [↑](#footnote-ref-162)
162. Road accidents present a typical example of a bilateral accident. Placing strict liability on the autonomous vehicle harms the incentives of the human driver, which makes little sense if human drivers are generally more dangerous than their A.I. counterparts. Another question, that is beyond the scope of this article, concerns liability of human drivers when A.V. are available. One could argue that once A.V. are significantly safer than humans. the exitance of A.V. offers a cost-effective precaution measure, so any human driver should be liable for not adopting the accident preventing technology *See* Ryan Abbott, The Reasonable Robot: Artificial Intelligence and the Law (2020). [↑](#footnote-ref-163)
163. *See* Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Physicians and Surgeons, <https://www.bls.gov/ooh/healthcare/physicians-and-surgeons.htm> (last visited December 20, 2022); WHO Reginal Office for Europe, *% of Physicians working in Hospitals*, European Healthcare for All database (last updated, 01 September 2022), <https://gateway.euro.who.int/en/indicators/hfa_506-5270-of-physicians-working-in-hospitals/>. [↑](#footnote-ref-164)
164. *See*, *e.g.*, Summerton, *supra* note 48. [↑](#footnote-ref-165)