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Abstract

In this paper we investigate the correct magnitude of pain and suffering damages for personal injuries. These damages differ greatly between and within countries, and the law of damages does not provide a framework to assess the correctness of the granted amounts. In our view, Law and Economics in combination with Health Economics is able to provide the required external framework.

In the Law and Economics literature, a tension exists between the prevention theory (stating that the injurer should fully compensate non-pecuniary losses) and the insurance theory (stating that the victim should not receive compensation for non-pecuniary losses, because he would not self-insure against these losses). We discuss the scarce literature that suggests a synthesis between these two theories: by basing damages on the amount that victims would spend in order to reduce the expected non-pecuniary accident losses, the injurer receives the correct incentives and the victim is not over-compensated. The Law and Economics literature, however, lacks a framework to connect the magnitude of the damages to the injuries of the victim.

The concept of Quality Adjusted Life Years (QALYs) from the domain of Health Economics can fill this gap. A QALY expresses the value of living one year in a certain health condition. By studying Health Economics literature, the impact of different health conditions on the quality of life may be assessed. By subsequently monetizing QALYs, this impact is expressed in monetary terms, thereby providing a non-arbitrary basis for pain and suffering damages.

We compare the amounts granted in pain and suffering damages in several European countries with the amounts that would result from a conservative estimation of the monetary value of a QALY for specific types of personal injuries. The conclusion is that the amounts that are currently awarded are (much) too low from a perspective of deterrence, but also from the more traditional legal compensation point of view.

Keywords: Damages, Health Economics, Law and Economics, Non-Pecuniary Losses, Pain and Suffering, Personal Injuries, Quality Adjusted Life Years, Tort Law, Value of Statistical Life, Value of Statistical Life Years

JEL Classification: I12, K13

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1. Introduction

In this paper we will address the question what the correct magnitude of damages for immaterial losses is from the point of view of Law and Economics and Health Economics. We limit ourselves to damages in tort law as a result of physical injuries. We will use the term ‘pain and suffering damages’ throughout the paper. In order to be able to answer this question, clarity regarding the goals of pain and suffering damages is needed. After all, only if it is clear what is intended with those damages, one can assess how high they should be in order to be able to reach that goal.

This paper is aimed at lawyers as well as legal economists. In our view, the insights offered in the Law and Economics literature are valuable to lawyers working in the field of tort damages. We will therefore sketch the economic analysis of tort law and of pain and suffering damages in Section 2. Here we will spend attention to the goals of tort law from a legal and a Law and Economics perspective. We will also discuss the debate in Law and Economics literature whether a victim who suffers immaterial loss should receive any compensation in the first place. In Section 3 we will treat the Law and Economics view regarding the correct magnitude of pain and suffering damages. In Section 4 we discuss the concept of *Quality Adjusted Life Years* (QALY), which expresses the gravity of different health conditions. This concept, which is well-known in the field of Health Economics, in our view, provides important information regarding pain and suffering damages, yet it has not sufficiently penetrated the Law and Economics discussions on this topic.¹ In Section 5 we will compare the magnitude of pain and suffering damages in concrete cases in different European countries with our theoretical findings. We will not reach an exact determination of the ‘correct magnitude’ of pain and suffering damages, because the existing research does not allow such a conclusion. What does become clear, however, is that the amounts as they are awarded are too low from a Law and Economics and Health Economics perspective. In Section 6, we conclude.

2. Pain and Suffering Damages in the Law and Economics Literature

2.1 Goals of Tort Law

In legal literature, a multitude of goals is attributed to tort law, such as compensation, appeasement (satisfaction), punishment, avoiding unjustified enrichment, maintaining subjective rights, deterrence and loss spreading. Traditionally, compensation is regarded as the most important goal. For the topic of pain and suffering damages, appeasement is the most relevant

¹ Miller has suggested to use QALYs as a technique that forensic experts can apply to help guide jury valuations on quality of life losses. Miller describes several existing QALY scales and argues that per case, depending on the injuries of the victim, different scales might be applied. Then, experts by using the selected scale have to evaluate the plaintiff's functional and psychological loss (by polling the plaintiff and possibly his caregivers and by examining existing surveys or even by surveying people similar to the victim) and subsequently convert it into QALY loss. Our paper differs from Miller's approach in the sense that we propose to use the general QALY weights as they can be found in health economics literature, without estimating them in each and every individual case. The costs of doing so in our view would be very high. We also use a much lower monetary value for a QALY than Miller does, to reduce the risk of overestimating non-pecuniary losses. In our view, QALYs offer a good starting point in the assessment of pain and suffering damages, because they focus on the duration and intensity of the health impairment. However, courts should have the possibility to also include other relevant factors into the final assessment. Our paper leaves more room for this than Miller's more detailed approach does. Finally, we provide a comparison of the QALY-based approach with the outcome of concrete cases in several European countries. See T.R. Miller, ‘Valuing Nonfatal Quality of Life Losses with Quality-Adjusted Life Years: The Health Economist's Meow’, (13) *Journal of Forensic Economics* 2000, p. 145-167.

goal besides compensation.² According to Williams, this ‘safety valve function’ of tort law is nowadays only of minor importance.³

In the Law and Economics approach, compensation of losses is not regarded as a separate goal, but rather as a means with which the goals of deterrence and loss spreading are aimed for.⁴ The prospect of having to pay damages may induce actors to take precautionary measures that can lower the accident probability and/or the magnitude of the losses. They also may decide to engage in the activity less often. Losses that still materialize may be transferred to the injurer through the duty to pay damages. If the injurer has better opportunities to spread the losses (through, e.g., a liability insurance, or if it regards a producer, through the price of the product), liability also contributes to the goal of loss spreading. The overall goal is minimization of the total accident costs. These consist of the costs of precautionary measures plus the losses that are expected to still occur (the so-called *primary accident cost*), the costs of having to bear the losses, which may be reduced by a better spread (the *secondary costs*) and the costs of the legal system (the *tertiary costs*).⁵ Appeasement in the sense that the victim derives utility from the knowledge that the injurer suffers negative financial consequences of his behavior plays no role in the economic analysis of tort law. In as far as such appeasement is sought, it should be reached through the use of criminal law.⁶

2.2 *The Limited Importance of an Accurate Assessment of Damages*

From a Law and Economics point of view, the law of damages is assessed in the light of the goal of minimizing total accident costs. In order to provide a potential injurer with the correct behavioral incentives regarding his care and activity level, he should face all possible negative consequences of his behavior. This implies that in principle, damages should fully compensate the victim. In case damages are systematically incomplete, the injurer will take too little care or engage in his activity too often. This problem exists for instance in case of fatal accidents, where damages do not encompass the value the deceased himself attached to his life.⁷ On the other hand, damages that are systematically too high cause the opposite problems. This can happen, for example, if an actor can be held fully liable, even if there is uncertainty regarding the question if his behavior has caused the losses.⁸

This, however, does not necessarily mean that damages have to be assessed as accurately as possible in each and every individual case, because that may be too costly. The desired level of accuracy is determined by a weighing of the additional costs of more accuracy in the determination of damages on the one hand, and the additional benefits thereof in the sense of

² S.D. Lindenbergh, *Smartengeld*, Deventer: Kluwer 1998, p. 29 ff. and Lindenbergh, *Smartengeld tien jaar later*, Deventer: Kluwer 2008, p. 3 ff; C. van Dam, *European Tort Law*, Oxford and New York: Oxford University Press 2006, p.302-303.

³ G. Williams, ‘The aims of the law of tort’, (4) *Current Legal Problems* 1951, p. 138; M. Lunney and K. Oliphant, *Tort law: Text and materials*, 3rd ed., Oxford: Oxford University Press 2008, p. 20.

⁴ See e.g. R.A. Posner, ‘A Theory of Negligence’, (1) *Journal of Legal Studies* 1972, p. 33; G. Calabresi, *The Costs of Accidents. A Legal and Economic Analysis*, 5th printing, New Haven: Yale University Press 1977, p. 26 ff; H.-B. Schäfer and C. Ott, *Lehrbuch der ökonomischen Analyse des Zivilrechts*, 4th edition, Berlin: Springer 2005, p. 125 ff; R. Cooter and T. Ulen, *Law and Economics*, 5th ed., USA: Pearson Addison Wesley 2008, p. 325 ff.

⁵ Calabresi 1977, p. 24 ff.

⁶ C. Ott and H.-B. Schäfer, ‘Schmerzensgeld bei Körperverletzungen. Eine ökonomische Analyse’, *Juristenzeitung* 1990, p. 573.

⁷ See W.V.H. Rogers, ‘Comparative Report’, in: W.V.H. Rogers (ed.), *Damages for Non-Pecuniary Loss in a Comparative Perspective*, Vienna: Springer 2001, p. 247.

⁸ See e.g. S. Shavell, *Foundations of Economic Analysis of Law*, Cambridge, Massachusetts: The Belknap Press of Harvard University Press 2004, p. 255.

better deterrence and spreading of losses on the other. More accurate assessment of damages can only improve the incentives of the tortfeasor, if the latter also has this better assessment at his disposal. If the tortfeasor does not know in advance the magnitude of the losses he can cause, a more accurate assessment *ex post* cannot provide better incentives *ex ante*. As long as the damages *on average* are assessed correctly, the potential tortfeasor who bases his decisions on assessments of the average loss will receive the correct incentives.⁹

Hence, the losses have to be assessed correctly on average. Systematic over- and underestimations have to be avoided, to prevent excessive or inadequate behavioral incentives. This implies that damages for pain and suffering do not have to be determined as precisely as possible in each separate case, so that it is possible to utilize standardized amounts.¹⁰ This fits the Dutch *Coma*-case,¹¹ where the Supreme Court considers that in assessing the losses, one should abstract from the concrete experience of the victim and should assess in a more objective manner to what extent immaterial losses exist. Standardization lowers the tertiary costs because fewer resources are spent on the assessment of damages, but also because the higher predictability of the damages may induce parties to settle at an earlier stage, which is less costly than litigating.¹² The improved predictability may also lower primary accident costs, because uncertainty regarding the damages can cause parties to take excessive care.¹³ Secondary accident costs are lowest if the losses are optimally spread. This implies that the optimal level of damages for the victim has to be determined. Hence, primary costs regard the optimal amount that the injurer should pay to receive the correct incentives, while secondary costs regard the optimal amount that the victim should receive. These two amounts are not necessarily identical, even though in practice they are coupled. In Section 2.3, we will discuss the possible tension between the two amounts in greater detail.

2.3 Damages for Immaterial Losses: Pay, but not Receive?

In the economic analysis of law, the distinction between pecuniary and non-pecuniary losses is made as follows. In case of a pecuniary loss, the victim loses money or replaceable goods. The damages received by the victim make up for the loss in money or enable him to replace the lost goods. In case of a non-pecuniary loss, non-replaceable ‘goods’ are lost or damaged.¹⁴ The damages received by the victim hence do not enable him to replace the lost goods. The money does yield him utility, but it does not mend the immaterial losses.

Two approaches exist regarding the question whether the immaterial losses should be compensated. We will discuss both approaches below.

The Prevention Theory

In order to provide the potential injurer with the correct behavioral incentives, he has to compensate both pecuniary and non-pecuniary losses, because both types constitute losses to the victim. If the injurer does not face both types of losses in the expected damages, he does not

⁹ L. Kaplow and S. Shavell, ‘Accuracy in the Assessment of Damages’, (39) *Journal of Law and Economics* 1996, p. 194.

¹⁰ On the issue of standardization, also see Rogers 2001, p. 272 ff.

¹¹ Supreme Court 20 September 2002, *NJ* 2004, 112.

¹² R.R. Bovbjerg, F.A. Sloan and J.F. Blumstein, ‘Valuing Life and Limb in Tort: Scheduling “Pain and Suffering”’, (83) *Northwestern University Law Review* 1989, p. 925; F.S. Levin, ‘Pain and Suffering Guidelines: A Cure for Damages Measurement “Anomie”’, (22) *University of Michigan Journal of Law Reform* 1989, p. 320.

¹³ Bovbjerg, Sloan and Blumstein 1989, p. 925; Levin 1989, p. 309, 310.

¹⁴; See e.g. J. Arlen, ‘Tort Damages’, in: B. Bouckaert and G. De Geest (eds.), *Encyclopedia of Law and Economics. Volume II. Civil Law and Economics*, Cheltenham: Edward Elgar 2000, p. 702; Shavell 2004, p. 242.

fully internalize the negative externalities of his behavior, and tort law cannot reach its preventive goal then.¹⁵ Adams argues that in cases where also the victim should receive behavioral incentives (the so-called *bilateral* accident situations, this in contrast to the *unilateral* accident situations where only the injurer can influence the accident probability and/or severity), immaterial losses should not be compensated. This provides him with an incentive to take precautionary measures, even if they are not visible so that they cannot be triggered by a defense of comparative or contributory negligence.¹⁶ In our view, this line of reasoning is problematic, because the incentives for the injurer diminish by not incorporating immaterial losses in the damages payment.¹⁷ We therefore think it is preferable to let the injurer pay for both types of losses, unless the influence of the victim on the occurrence of the accident was larger. In that case it is more important to provide the victim rather than the injurer with the correct incentives.

The Insurance Theory

The above said does not necessarily mean that the victim should receive damages for immaterial losses. This will sound strange to most lawyers, because damages paid by the injurer usually are received by the victim. From a Law and Economics perspective, however, the relevant question is whether people would want to insure themselves against immaterial losses. If they would not, then tort law should not force such coverage upon them.¹⁸

People want to insure themselves against pecuniary losses, because after such losses have occurred, they have less wealth left. Due to the decreasing marginal utility of wealth, the value of an additional Euro is lower, the higher the wealth level. After all, with the first Euros that someone acquires, he will fulfill his most important needs. With additional money, less important needs are satisfied. An insurance against pecuniary losses enables a person to spend pre-accident Euros with a relatively low marginal value on the insurance premium. If the losses actually materialize, the insurance pays the agreed amount of Euros which, due to the decrease in wealth have a relatively high marginal value. The loss in utility caused by the payment of the premium weighs less heavily than the chance of suffering a larger utility loss due to the decrease in wealth in absence of insurance.

In case of non-pecuniary loss, the marginal utility of money does not increase, because the victim does not lose wealth. Marginal utility might even decrease, if the victim after the accident cannot enjoy his money to the same extent as before. People do not want to insure against non-pecuniary losses, because the utility they lose due to payment of the premium is not offset by a higher expected utility after receiving the insurance benefits.¹⁹ Because people do not want to insure themselves, they should not receive compensation for such losses through the tort system. After all, that would lead to an increase in prices of products, services and liability insurance premiums, resulting in a veiled insurance.

Croley and Hanson argue that people do want to insure against non-pecuniary losses, because such losses lower their overall utility level. In the post-accident situation they may value money higher than before, even though their wealth has remained intact.²⁰ In as far as people

¹⁵ *Idem.*

¹⁶ M. Adams, 'Warum kein Ersatz von Nichtvermögensschäden?', in: C. Ott & H.-B. Schäfer (red.), *Allokationseffizienz in der Rechtsordnung*, Berlin: Springer-Verlag 1989, p. 215.

¹⁷ Adams acknowledges this problem for situations where the losses almost fully consist of immaterial losses, see Adams 1989, p. 217.

¹⁸ Ott and Schäfer 1990, p. 568.

¹⁹ D.D. Friedman, 'What is 'Fair Compensation' for Death or Injury?', (2) *International Review of Law and Economics* 1982, p. 82 ff.; Adams 1989, p. 215; Ott and Schäfer 1990, p. 567 and Shavell 2004, p. 270 ff.

²⁰ S.P. Croley and J.D. Hanson, 'The Nonpecuniary Costs of Accidents: Pain-and-Suffering Damages in Tort Law', (108) *Harvard Law Review* 1995, p. 1815.

do not take out such insurance in practice, this is, according to the authors, caused by a lack of information (regarding, e.g., the possible extent of the non-pecuniary losses, the probability of such losses occurring and the amount of compensation that is then desired), because it is socially not accepted to attach a price to pain and sorrow, or due to legal restrictions.²¹ Other possible explanations of why people do not regularly take out insurance against non-pecuniary losses are the fact that tort liability already covers immaterial losses to a certain extent so that there is less need for a separate insurance, as well as the problems that insurers face as a result of limited monitoring possibilities in countering the problems of moral hazard and adverse selection.²²

Pryor argues that the conclusion from the insurance theory that the marginal utility of money remains the same or even decreases after suffering non-pecuniary losses is flawed. First, empirical research in this area is based on the viewpoint of nondisabled who have to assess the situation if they would be disabled. Given their informational problems, Pryor doubts whether they can provide accurate statements about marginal utility of money after a disability.²³ She assesses that these problems will lead to an underestimation of the marginal utility.²⁴ Furthermore, she argues that the distinction between pecuniary losses and non-pecuniary losses will often be hard to make, so that the insurance theory does not provide clear guidelines regarding which part of the losses should be compensated and which part not.²⁵

3. The Correct Magnitude of Pain and Suffering Damages from a Law and Economics Perspective

3.1 Synthesis between Prevention and Insurance Theory

According to the prevention theory, the injurer should compensate the immaterial losses he has caused, because otherwise he receives inadequate care incentives. According to the insurance theory, the victim should not receive compensation, because he would not have self-insured against these losses and tort law should not force coverage upon him. In our view, a synthesis between both theories exists.

The nuances of Croley and Hanson suggest that people would like to take out a certain amount of coverage against immaterial losses and do so in practice. The problems that hinder the realization of a proper functioning insurance market are much less relevant in a tort law setting. Potential victims do not have to make ex ante assessments of the probability and extent of immaterial losses, because tort law operates ex post. Potential injurers, in as far as they supply products or services, can incorporate the average of these expected damages in their prices.²⁶ Furthermore, there is much less resistance against incorporating pain and suffering damages in tort damages than against taking out insurance against such losses.²⁷ In addition, Pryor argues that marginal utility might increase after suffering immaterial losses so that rational people would cover (part of) these losses by an insurance. The tension between prevention theory and insurance theory hence is much less strong that it appeared at first sight.

²¹ Croley and Hanson 1995, p. 1845 ff.

²² Bovbjerg, Sloan and Blumstein 1989, p. 934.

²³ E.S. Pryor, 'The Tort Law Debate, Efficiency, and the Kingdom of the Ill: A Critique of the Insurance Theory of Compensation', (79) *Virginia Law Review* 1993, p. 110ff.

²⁴ Pryor 1993, p. 117.

²⁵ Pryor 1993, p. 125 ff.

²⁶ Croley and Hanson 1995, p. 1898.

²⁷ Croley and Hanson 1995, p. 1906 ff.

Several authors offer a further solution for the alleged tension.²⁸ It is important to realize that someone who does not want to fully insure against immaterial losses because the premium is too high, is nonetheless willing to spend resources on measures that can lower the expected immaterial losses. The following quote from Posner fits this idea: ‘We disagree with those students of tort law who believe that pain and suffering are not real costs and should not be allowable items of damages in a tort suit. No one likes pain and suffering and most people would pay a good deal of money to be free from them. If they were not recoverable in damages, the cost of negligence would be less to the tortfeasor and there would be more negligence, more accidents, more pain and suffering, and hence higher social costs.’²⁹ The relevant question then becomes how much efforts a potential victim would spend in reducing the expected immaterial losses. The resulting amount is, from the prevention point of view, the correct measure for the damages that the injurer should pay. After all, if the injurer is induced to take the same measures as the victim would have taken himself, then the former has correctly internalized the externalities. This amount, at the same time, is the correct measure for the damages that the victim should receive. The resulting increase in prices or premiums which the victim may face due to the inclusion of immaterial losses in the damages payments, are based on the amount he himself would have spent if he would have been the one taking the precautionary measures. Different than with ex post compensation of the full immaterial losses, this ex ante determined amount of compensation does not yield a higher level of coverage than the victim would have chosen himself!³⁰

It is important to realize that the *total* costs that someone is willing to spend on reducing the expected accident losses are not only determined by the non-pecuniary losses, but also by the pecuniary losses. We will return to this issue in the next section.

3.2 *The Correct Magnitude of Pain and Suffering Damages*

Pain and suffering damages have to be based, according to the above-explained line of reasoning, on the resources that the victim would have spent himself on reducing the expected accident losses. If someone, for example, due to the risk of immaterial losses would have spent €1,000 on precautionary measures which lower the probability of an accident in which he gets paralyzed by a half per mil, statistically this implies that the value of avoiding the paralysis amounts to €2 million (€1,000 / 0.0005). The pain and suffering damages to be paid for paralyzing the victim hence should also amount to €2 million.³¹

There exists an extensive literature on the ‘value of a statistical life’ (VSL), in which it is investigated how much costs people are willing to bear to reduce the probability of fatal accidents.³² This literature offers a first step in answering the question regarding the correct magnitude of pain and suffering damages. The VSL is derived from decisions which people take and which influence health and safety, such as buying a dangerous product or choosing a dangerous job. Such choices contain an implicit tradeoff between money and safety. On the basis of these tradeoffs, the VSL is estimated. The resulting amounts differ greatly, but ac-

²⁸ Bovbjerg, Sloan and Blumstein 1989, p. 913 footnote 31; M. Geistfeld, ‘Placing a Price on Pain and Suffering: A Method for Helping Juries Determine Tort Damages for Nonmonetary Injuries’, (83) *California Law Review* 1995, p. 779; Schäfer and Ott 2005, p. 371.

²⁹ *Kwasny v. United States*, 823 F.2d 194, 197 (7th Cir. 1987).

³⁰ Schäfer and Ott 2005, p. 373.

³¹ Schäfer and Ott 2005, p. 371. Also see Friedman 1982, p. 85 and 91.

³² For a review article, see e.g. W.K. Viscusi and J.E. Aldy, ‘The Value of a Statistical Life: A Critical Review of Market Estimates throughout the World’, (27) *The Journal of Risk and Uncertainty* 2003, p. 5-76.

According to Sunstein, the VSL is set at about €5.9 million.³³ This amount encompasses both the pecuniary and the non-pecuniary losses. Miller argued in 1989 that of the VSL, which he assessed at \$ 2 million on the basis of the then existing literature, about \$1-1.5 million consists of immaterial losses.³⁴ Extrapolating to more recent estimates of the VSL, about €3.0-4.4 million would consist of immaterial losses. According to Viscusi, non-pecuniary losses constitute about 40% of the total losses in product liability cases and 75% in medical malpractice cases. This is about the same order of magnitude as Millers results.

As we have mentioned above, the VSL is only a first step in answering the question regarding the correct magnitude of pain and suffering damages. At least two additional steps have to be taken. First, one should realize that pain and suffering damages in many cases do not refer to fatal accidents, but to non-fatal injuries. Second, many injuries may heal over time so that the resulting non-pecuniary loss is, at least in part, temporary in nature. The pain and suffering damages in such cases should therefore also be based on the duration of the injuries.

To start with this last point, even though the VSL cannot take account of the time factor because it only relates to death, the so-called ‘value of a statistical life year’ (VSLY) does contain a time related factor. In essence, the VSLY is derived by dividing the VSL by the life expectancy of the subject of research. If the VSLY is applied, damages for fatal accidents would be lower for older victims, which could be regarded as an undesirable consequence. For pain and suffering damages for non-fatal accidents, this need not be problematic, because those damages should be connected to the losses of the victim. For shorter lasting injuries, be it because the injury itself lasts shorter or because the victim has a lower remaining life expectancy due to his higher age, it makes sense to lower the pain and suffering damages accordingly. The VSL is not suited for this, the VSLY is. Research that tries to attach a monetary value to the VSLY often results in amounts of about €7,500 to €204,000.³⁵ If, in order to determine the fraction of immaterial losses, the same extrapolation method is used as with the VSL, amounts of about €43,750 to €153,000 result.

The VSL and VSLY refer to fatal accidents. For cases with very serious injuries, where research shows that the large majority of the respondents regards the results as comparable or more serious than death, pain and suffering damages should be in the order of magnitude of the VSL/VSLY. For less serious injuries, pain and suffering damages should be proportion-

³³ C.R. Sunstein, ‘Lives, Life-Years, and Willingness to Pay’, (104) *Columbia Law Review* 2004, p. 205; C.R. Sunstein and E.A. Posner, ‘Dollars and Death’, (72) *University of Chicago Law Review* 2005, p. 563; W.K. Viscusi, ‘The Flawed Hedonic Damages Measure of Compensation for Wrongful Death and Personal Injury’, *Vanderbilt Law and Economics Research Paper No. 08-05* 2008, p. 3. The amounts in our paper are, unless noted differently, calculated as follows. The American amounts from the original publications are first expressed in dollars from 2008 (see http://www.bls.gov/data/inflation_calculator.htm). Subsequently we have expressed them in Euros on the basis of the most recent Purchasing Power Parity (PPP) as published by the OECD: 0.850 (see <http://www.oecd.org/dataoecd/61/54/18598754.pdf>). We choose to apply the PPP for the Euro area, but we are aware that there are differences between the PPP of the countries within the Euro area. We leave the question whether pain and suffering damages should be harmonized within the European Union or if the amounts should differ per country untreated in our paper, in order to be able to focus on the relevance of insights from Health Economics. Applying the PPP for the Euro area avoids having to list separate amounts for all Member States.

³⁴ T.R. Miller, ‘Willingness to Pay Comes of Age: Will the System Survive?’, (93) *Northwestern University Law Review* 1989, p. 893, 894.

³⁵ See M. Johannesson, *Theory and Methods of Economic Evaluation of Health Care*, Dordrecht: Kluwer Academic Publishers 1996, p. 68; H. R. Taylor, M. L. Pezzullo and J. E. Keeffe, ‘The economic impact and cost of visual impairment in Australia’, (90) *British Journal of Ophthalmology* 2006, p. 274; D. Kenkel, ‘Using Estimates of the Value of a Statistical Life in Evaluating Regulatory Effects’, *United States Department of Agriculture Economic Research Service mp1570d*, p. 5 <www.ers.usda.gov/publications/mp1570/mp1570d.pdf>. A. Krupnick, ‘Valuing Risk Reductions for Different Hazards’, *United States Department of Agriculture Economic Research Service mp1570m*, p. 87 however mentions values of (calculated in Euros from 2008) €55,000 to €333,500 <www.ers.usda.gov/publications/mp1570/mp1570m.pdf>.

ally reduced.³⁶ The Law and Economics literature, however, does not indicate how to assess the relative weight of the different types of immaterial losses.

Converting VSL/VSLY into pain and suffering damages entails several difficulties. First, the assessed values of VSL and VSLY differ greatly. However, by using average values, this difficulty may be overcome. Second, there is no generally accepted method to determine the relative weight of different health conditions. Furthermore, in order to determine these relative weights, the losses of the victim should be assessed as accurately as possible. Finally, the fact that the victim has to describe his own situation in order to assess his relative weight opens the possibility of strategic behavior.³⁷

In our view, insights from Health Economics offer a good reference to reach a relative scaling of different health conditions. This way, the Law and Economics ideal of *ax ante* assessed pain and suffering damages may still be attainable. These insights from Health Economics form the topic of the next section.

4. Insights from Health Economics

4.1 Quality Adjusted Life Year (QALY)

A QALY is a measure regarding the value of living one year in a certain health condition. This health condition is used as a proxy for the quality of life during that year. QALYs are often used in evaluating different health programs, medical treatments and techniques.³⁸

In order to be able to calculate QALYs, different health conditions have to be established, ranging from perfect health to death and everything in between. Each condition is assigned a QALY-weight, varying from 0.00 (death) to 1.00 (perfect health). Conditions which are regarded as even worse than death are assigned a negative value. QALYs are calculated as the sum of the health conditions of the individual during the time those conditions last. By applying QALYs, one can form an opinion on the relative value of different treatment possibilities. Suppose for example that for a person with a certain ailment two treatments exist which are equally expensive. Treatment A increases the quality of life with 0.1 for 5 years, treatment B by 0.2 for 3 years. According to the QALY method, treatment B is preferred, because it yields 0.6 QALY (0.2×3) while treatment A 'only' yields 0.5 QALY for the same amount of money.³⁹

Different methods exist for trying to establish QALY weights.⁴⁰ In some methods, respondents are asked to compare two situations in order to elicit their overall perception of a spe-

³⁶ Schäfer and Ott 2005, p. 377. Also see Miller 1989, p. 896 ff.

³⁷ Bovbjerg, Sloan and Blumstein 1989, p. 951, 952.

³⁸ See e.g. J. Brazier, et al., 'A review of the use of health status measures in economic evaluation', (3) *Health Technology Assessment* 1999 p. 3, 4; P. Dolan, 'The measurement of health related quality of life for use in resource allocation decisions in health care', in: A.J. Culyer and J.P. Newhouse (eds.), *Handbook of Health Economics*, vol. 1B, Amsterdam: Elsevier Science B.V. 2000.; S. Folland, A.C. Goodman and M. Stano, *The Economics of Health and Health Care*, 5th ed., Upper Saddle River (NJ): Prentice Hall 2007, p. 81.

³⁹ This comparison does not yet show whether treatment A and/or B are worth their costs. For this, one has to evaluate how much a QALY is worth in money terms. See Section 4.2 below for this topic.

⁴⁰ See e.g. E. Nord, 'Methods for quality adjustment of life years', (34) *Social Science and Medicine* 1992, p. 561 ff.; M. Johannesson, B. Jönsson and G. Karlsson, 'Outcome Measurement in Economic Evaluation', (5) *Health Economics* 1996, p. 283-284; H. Bleichrodt and M. Johannesson, 'Standard gamble, time trade-off and rating scale: experimental results on the ranking properties of QALYs', (16) *Journal of Health Economics* 1997, p. 155-157; Brazier et al. 1999, p. 23 ff.; Dolan 2000, p. 1733 ff.; U.S. EPA, Office of Research and Development, *Human Health Metrics for Environmental Decision Support Tools: Lessons from Health Economics and Decision Analysis* (Sept. 2001) p. 16, 17; J.K. Hammitt, 'QALYs Versus WTP', (22) *Risk Analysis* 2002, p. 994-996 for a more extensive treatment.

cific ailment. In the ‘standard gamble’ method, for example, people are asked to choose between living in a certain health condition on the one hand, and undergoing treatment which, with varying possibilities, leads to either perfect health or death on the other hand. The lowest possibility of living in perfect health which the respondents still assess as high enough to undergo the treatment, determines the QALY weight of the ailment. If for instance, I am indifferent between continuing to live with the ailment in question or undergoing a treatment which has 70% probability to restore me in perfect health and 30% probability of leading to death, then the QALY weight of the ailment is 0.7. In another method, the ‘time trade-off’, respondents are asked to trade off x years in perfect health with y years with a certain health condition. The ratio x/y determines the QALY weight. Hence, the more life-years the respondent is willing to forego in order to achieve perfect health, the lower the QALY weight for the health condition involved. So, if I assess 40 years life expectancy with the ailment as equal to 30 years in perfect health, the QALY factor is 0.75. In the ‘person trade-off’, respondents are asked to make a trade-off between improving the health of people in one health condition against people in another health condition. Respondents are e.g. asked to choose between improving the health or extending life expectancy of x people in the first (better) condition and y people in the second (worse) condition.⁴¹ The ratio x/y determines the relative QALY weights of both conditions. If respondents are e.g. indifferent between extending life with one year for 20 healthy people and 25 people with a certain health condition, then the QALY-weight of the second health condition is $20/25 = 0.8$. In another method, the ‘visual analogue scale’, respondents are asked to rank the ailment on a vertical line with concrete endpoints ranging from 0 to 100 where 0 represents death and 100 represents perfect health. To account for ailments that may be perceived as worse than death the endpoints of the scale may be modified to 0 representing the worst imaginable health condition and 100 representing the best imaginable health condition. Between the endpoints the line is separated by equivalent intervals so that the ranking of the ailment yields its QALY weight. For example, an ailment rated with 85 points on the scale has a QALY factor of 0.85.

Other ways used to establish QALY weights are frequently referred to as ‘generic’ or ‘quality of life’ measures as they measure general attributes of health conditions without emphasizing a particular ailment. One of these measures, the EuroQoL EQ-5D⁴² questionnaire, differentiates health states using five dimensions: mobility, self care, usual activities, pain/discomfort and anxiety/depression. In the first part of the questionnaire, respondents are asked to mark their health condition on the basis of these five dimensions by indicating whether they have no problems, moderate problems or extreme problems in each dimension. Each of these levels is assigned a weight previously elicited by the visual analogue scale or the time trade off method. In the second part, respondents are asked to rank their health condition on a visual analogue scale thus communicating their overall perception of the ailment. All possible combinations of dimensions and their levels yield 243 different health states to which death and unconsciousness are added. The QALY weight for the health state is calculated from the overall evaluation of the respondent of all health dimensions by adding up the relevant weights and subtracting them from 1.00, i.e. perfect health. Another generic measure, the ‘Health Utilities Index Mark 3’ (HUI3)⁴³, uses eight dimensions to classify health states: vision, hearing, speech, ambulation, dexterity, emotion, cognition and pain. Each dimension

⁴¹ Hammitt 2002, p. 995. See also U.S.EPA 2001, p.17.

⁴² See www.euroqol.org/ and especially K. Cheung, M. Oemar, M. Oppe and R. Rabin, ‘EQ-5D User Guide’, 2009 <http://www.euroqol.org/fileadmin/user_upload/Documenten/PDF/User_Guide_v2_March_2009.pdf>.

⁴³ See www.fhs.mcmaster.ca/hug/hui3.htm. See also J. Horsman, W. Furlong, D. Feeny and G. Torrance, ‘The Health Utilities Index (HUI®): concepts, measurement properties and applications’, (1) *Health and Quality of Life Outcomes* 2003 <<http://www.hqlo.com/content/1/1/54>>. HUI3 is the most recently developed Health Utilities Index. Previous versions are HUI, HUI1 and HUI2.

comprises five or six different levels (speech, emotion and pain have five levels) indicative of a gradual deterioration in that dimension. These levels are assigned a weight previously elicited by standard gamble and visual analogue scale methods. Combining all dimensions and levels, 972,000 health states can be realized in total. Respondents are asked to indicate how much a certain condition affects the various health dimensions. The QALY weight of the health condition is calculated by a multiplicative function which accounts for the overall evaluation of the respondent of all health dimensions. Other generic measures to elicit QALY weights are the 'Quality of Well Being Scale', the 'SF-6D', the '15D' and the 'Rosser disability/distress scale'. However, so far the EQ-5D and the HUI3 are regarded as better measures for the QALY weight elicitation.⁴⁴

The different methods lead to different results, among others due to the type of questions being asked and the comparison being made (with death, perfect health or exactly with another ailment). The standard gamble, the time trade off and the person trade off are methods that require respondents to compare two different situations on the basis of health (un)certainly, health duration and health of other people respectively, whereas the visual analogue scale asks for the overall perception of a health state marked on a line, tasks which may be difficult for respondents to understand and perform. On the other hand the generic measures with the form of questionnaires are easier to understand but since they classify health states on the basis of specified dimensions there may be other affected aspects of health conditions that these measures will not be able to evaluate. Furthermore it is relevant whether the questions are asked to people who actually have the ailment or not, to doctors or other health specialists. Depending on who answers the questions, results may again be different. If the people who suffer the ailment are judged as more competent for the elicitation of QALY weights, the question then becomes when to ask them. People can adapt themselves to their life circumstances and thus an evaluation of the health condition made when this is first incurred may be different from an evaluation in a later period.⁴⁵ Hence, much research is still needed and refinement of methods is necessary in order to acquire more uniform QALY weights for the different health conditions.

4.2 Pain and Suffering Damages Based on QALYs

Notwithstanding the abovementioned problems, we think that the insights that are acquired in Health Economics so far are of great value for the topic of pain and suffering damages. Obviously the results have to be handled with care due to the problems discussed above. However, in our view, even with the restrictions that still exist, it is better to base the damages for deteriorations in health conditions on the results of this specialized research than on the amounts that courts have awarded in the past. After all, there is no reason to assume in advance that these judgments approximate the amounts which would do justice to the gravity of the immaterial loss.

On the basis of the extensive Health Economics literature in which assessments of QALY profits of different treatments and medical interventions are being made, educated assessments of the average QALY loss due to health impairments can be made. This, in our view, enables the relative ranking of immaterial losses mentioned in Section 3.2. By subsequently attaching a money value to a QALY, pain and suffering damages may be determined.⁴⁶ This

⁴⁴ See Brazier et al. 1999, p.76.

⁴⁵ Dolan 2000, p. 1738, 1739.

⁴⁶ See e.g. M. Johannesson and M.C. Weinstein, 'On the decision rules of cost-effectiveness analysis', (12) *Journal of Health Economics* 1993, p. 466; H. Bleichrodt and J. Quiggin, 'Life-cycle preferences over consumption and health: when is cost-effectiveness analysis equivalent to cost-benefit analysis?', (18) *Journal of Health*

can be done by evaluating alternative treatments in terms of the QALYs they generate and the costs to be implemented. By comparing the costs of the health treatments per QALY gained one arrives at a potential money value for QALY. Another way is to calculate the willingness to pay for a QALY increase. A recent overview of literature which attaches a money value to a QALY⁴⁷ indicates that authors who have calculated the ‘willingness to pay’ for a QALY reach a value of about €100,000 to €150,000. Others look for the limits below/above which an additional QALY is worth/not worth its costs and arrive at an upper limit of about €184,000. The famous ‘kidney dialysis value’, which is based on the consideration that kidney dialysis is regarded as a method which is (more than) worth its costs, poses a lower limit of about €79,500 to €102,000 for one QALY. The English National Institute for Clinical Excellence (NICE) uses a lower limit of about €32,500 to €48,500, which in most literature is regarded as too low.⁴⁸ In an overview from 2000, where the value of a QALY is deduced from VSL-research, an amount of €306,000 is mentioned as median value of the different estimates (28 of the 35 estimates exceed €13,000).⁴⁹

Different than with the VSL(Y), the QALY only regards immaterial losses, because it relates to the impact of medical conditions on the *quality of life*, not on the wealth of the affected individual. Hence, the applied QALY value does not have to be reduced by a fraction expression the pecuniary loss.

5. Magnitude of Pain and Suffering Damages: Legal and Economic Standards Compared

5.1 Legal and Economic Standards

Many countries recognize non-pecuniary losses as compensable, although significant differences exist in the situations in which these damages are granted, the legal basis on which they are grounded and the magnitude of the damages.⁵⁰ In case law, several factors are distinguished which are relevant in determining the magnitude of pain and suffering damages, such as the nature, duration and intensity of pain, grief and forgone joy of life, decreased life expectancy, remaining impairments, psychological problems, *et cetera*. Especially the nature and extent of the injuries have a large influence on the final magnitude.⁵¹ Therefore, the QALY, where the type of health impairment determines the QALY weight, in our view forms a good basis to determine the pain and suffering damages. After all, the more serious the health impairment is, the lower the QALY level of the victim will be, and the longer the

Economics 1999, p. 683 ff.; P. Dolan and R. Edlin, ‘Is it really possible to build a bridge between cost-benefit analysis and cost-effectiveness analysis?’ (21) *Journal of Health Economics* 2002, p. 828; T. Klose, ‘A utility-theoretic model for QALYs and willingness to pay’, (12) *Health Economics* 2003. Also see the EuroVaQ project which aims at developing robust methods to determine the monetary value of a QALY across a number of European Member States: <<http://research.ncl.ac.uk/eurovaq/index.html>>.

⁴⁷ D. Kenkel, ‘WTP- and QALY-Based Approaches to Valuing Health for Policy: Common Ground and Disputed Territory’, (34) *Environmental & Resource Economics* 2006, p. 421.

⁴⁸ M. Pomp, W. Brouwer and F. Rutten, *QALY-tijd. Nieuwe medische technologie, kosteneffectiviteit en richtlijnen*, Den Haag: Centraal Planbureau 2007, p. 37. <www.cpb.nl/nl/pub/cpbreeksen/document/152/doc152.pdf>. See p. 39 for other research that yields low values.

⁴⁹ R.A. Hirth, M.E. Chernew, E. Miller, M. Fendrick and W.G. Weissert, ‘Willingness to Pay for a Quality-adjusted Life Year: In Search of a Standard’, (20) *Medical Decision Making* 2000, p. 338, 340.

⁵⁰ For an extensive overview, see Rogers 2001; B.A. Koch and H. Koziol, ‘Comparative Analysis’, in: B.A. Koch and H. Koziol (eds.), *Compensation for Personal Injury in a Comparative Perspective*, Vienna: Springer 2002, p. 424 ff.; G. Comandé, ‘Towards a Global Model for Adjudicating Personal Injury Damages: Bridging Europe and the United States’, (19) *Temple International and Comparative Law Journal* 2005, p. 247.

⁵¹ Lindenbergh 1998, p. 235 ff. The same idea shows from Rogers 2001, Comandé 2005, p. 260 ff. and L. Jaeger and J. Luckey, *Schmerzensgeld* (4th edition), Münster: ZAP Verlag 2008, p. 212 ff.

health impairment lasts, the higher the total QALY decrease of the victim will turn out. Furthermore, this measure exactly expresses the non-pecuniary losses, because it regards the quality of life. Hence, the resulting amounts are exclusive of any additional pecuniary losses. The magnitude of pain and suffering damages differs between countries. In the Netherlands, for example, the granted damages are often lower than in other European countries⁵² and the United States.⁵³ The highest amount in the Netherlands was about €192,000, in for instance Germany €114,000, in Italy €1,024,000, in England €30,000, but for instance in Sweden €122,000 and in Denmark €8,500. This raises the question regarding the correct magnitude of pain and suffering damages. This question cannot be answered by merely comparing the amounts granted in different countries, because that method lacks an external yardstick. In order to answer the question, we therefore use the insights developed in Sections 3 and 4 and compare those insights with a number of concrete cases from different countries.⁵⁴

In the sections below, we provide information on the amounts of pain and suffering damages that were granted for a number of specific injuries in several European countries. Subsequently we compare these amounts with insights from the field of Health Economics, where QALY weights for the selected medical conditions are assessed. The Health Economics research in this area is extensive. We have chosen to only use publications which receive a quality score of at least 4.5 on a scale ranging from 1.0 to 7.0 indicating lowest and highest quality respectively. The quality scores can be derived from the Cost-effectiveness Analysis Registry (CEA) of the Center for the Evaluation of Value & Risk in Health from Tufts Medical Center.⁵⁵

It is important to note that in the Health Economics literature, the passing of time is relevant. Costs of medical treatment may be incurred today while the benefits only occur in the future. Furthermore, the costs of medical treatment may be recurring during a certain period. Because of this passing of time, costs and benefits are discounted. Often the studies contain a sensitivity analysis using different discount rates to evaluate the exact influence of the discount factor.⁵⁶ As far as we know, there is no common opinion on the 'correct' discount factor in Health Economics research. In practice, a discount factor of about 3-5% is often applied.⁵⁷ It is undisputed that the costs of medical treatment should be discounted, because spending the money comes at the opportunity cost of investing it and receiving a return. There has been discussion, however, whether the benefits realized in the future should also be discounted, because they do not concern money which can be invested, but rather increases in the quality of life. However, in order to account for the time preference, also benefits should be discounted, but not necessarily with the same factor as the costs.⁵⁸ The NICE in its previous guidelines applied a discount factor of 6% for costs and 1.5% for health benefits. In a more recent version of the guidelines, both rates were set at 3.5%. According to Brouwer et al., this is wrong, because it does not incorporate the fact that the monetary value of health

⁵² See Lindenbergh 2006, p. 10. The amounts mentioned in the text above are derived from this overview.

⁵³ A. Sebok, 'Translating the Immeasurable: Thinking About Pain and Suffering Comparatively', (55) *DePaul Law Review* 2006, p. 392; S.D. Sugarman, 'A Comparative Law Look at Pain and Suffering Awards', (55) *DePaul Law Review* 2006, p. 418.

⁵⁴ Utilizing the insights from Health Economics in our view solves the issue discussed by Rogers 2001, p. 248 that 'damages for non-pecuniary losses are certainly arbitrary in the sense that it is difficult to find a logical basis on which damages for quadriplegia should be €300,000 rather than, say, €30,000 or €3,000,000'. In a similar sense, see Comandé 2005, p. 301 ff.

⁵⁵ See <https://research.tufts-nemc.org/cear/default.aspx>.

⁵⁶ See e.g. D.J. Torgerson and J. Raftery, 'Discounting', *British Medical Journal* 1999, p. 915.

⁵⁷ W.B.F. Brouwer et al., 'Need for differential discounting of costs and health effects in cost effectiveness analyses', *British Medical Journal* 2005, p. 446.

⁵⁸ Torgerson and Raftery 1999, p. 915.

effects is expected to grow over time. They therefore argue that the discount factor for health effects should be lower than the discount factor for costs.⁵⁹

Be this as it may, for the purpose of our paper, a different type of discounting is necessary. We will use the insights from the Health Economics literature regarding the impact of medical conditions on the quality of life. This way, we assess the non-pecuniary loss caused by personal injuries. By relating this to a monetary value for a QALY, we derive a monetary expression of this non-pecuniary loss. After having done so, we still have to account for the duration of the medical condition. For example, if the monetary expression of a certain injury would amount to €10,000 per year during a period of ten years, the damages should not simply be assessed at €100,000 but at the net present value of ten annual future payments of €10,000. The exact outcome depends on the discount factor being applied. A discount factor of 4% would result in a lump sum payment of €84,353 while a discount factor of 6% would lead to €78,017. In this paper, we will apply a discount factor of 4%, which is higher than the rate of 2.5% set in the United Kingdom⁶⁰ and the 3.5% suggested by NICE. Weir et al. in their periodical revision on interest rates in the *Expert Witness Newsletter* argue that for Canada, a discount factor of a maximum of 3% should be applied.⁶¹ In our view, choosing a discount factor of 4% avoids the risk of overestimating the monetary value of non-pecuniary losses due to inadequate discounting.

5.2 Concrete Cases

5.2.1 Spinal Cord Lesion / Paralysis

In cases of spinal cord lesion, in the Netherlands damages in the amount of €70,000 to €24,000 are granted, depending on the position of the lesion, remaining pain, possible influence on fertility, incontinence *et cetera*.⁶² In a Dutch case from 1999, the Appellate Court granted €90,756 in pain and suffering damages to a 25 year old victim who was paralyzed in an accident due to a spinal cord lesion. Expressed in Euros from 2006, this would be €111,630.⁶³ In Germany, a 25 year old man who suffered a spinal cord lesion in an accident for which he was comparatively negligent for 1/3 received €150,000.⁶⁴ In another German case, the court awarded €200,000 to a victim who was paralyzed from the neck down due to a spinal cord lesion. In other cases, even higher amounts were awarded.⁶⁵ The highest German award in pain and suffering damages, as already mentioned, were awarded for a high spinal cord lesion of a 3.5 year old boy who cannot breathe on his own anymore, who suffers from remaining pain and also suffered other injuries: €614,000. In Greece, €250,000 was granted to a 23 year old woman who suffered from quadriplegia due to a spinal cord lesion.⁶⁶ In another Greek case, the court awarded €128,000 to a 25 year old man who was found comparatively negligent by 40% for the accident that resulted in his paralysis due to a spinal cord lesion.⁶⁷ In Italy the amount of €1,024,128 was awarded to an 18 year old victim who was ren-

⁵⁹ Brouwer et al. 2005, p. 447.

⁶⁰ See e.g. W.S. Chan and F.W.H. Chan, 'On selection of the discount rate for actuarial assessment of damages in personal injury litigation in Hong Kong', (2) *Law, Probability and Risk* 2003, p. 17.

⁶¹ L. Weir et al., 'The Discount Rate Revisited (Spring 2008)', (13) *Expert Witness newsletter* 2008, http://www.economica.ca/ew13_1p1.htm.

⁶² ANWB Smartengeld, p. 114 ff. The amounts are expressed in Euros from 2006.

⁶³ ANWB Smartengeld, p. 116.

⁶⁴ Jaeger and Luckey 2008, p. 1067.

⁶⁵ Jaeger and Luckey 2008, p. 1068 ff.

⁶⁶ Kalamata Court of First Instance 107/2003, online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

⁶⁷ Leukada Court of First Instance 472/2004, online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

dered paralyzed due to spinal cord lesion after a car accident.⁶⁸ The victim's young age and the severity of the injury (85% paralysis) increased the damage award.

In a publication from 1999, a cost effectiveness research regarding Computed Tomography (CT) scans for trauma patients was published. Major trauma patients arriving at a trauma center are assumed to have unstable cervical spine injuries, until proven differently. In order to establish if this type of injury indeed exists, the standard procedure is a radiographic scan, which however does not always show the injury. The more expensive CT scan provides better information. The article investigates whether the better results of the CT scan are worth the costs.⁶⁹ The utility adjustments caused by the spinal injury are estimated with the use of the HUI2. The QALY weight of paralysis is assessed at 0.516 (ranging from 0.465 to 0.611).⁷⁰

Assuming a non-perfect health before the paralysis, e.g. a QALY weight of 0.9, the decrease due to the paralysis is 0.384 (0.9 – 0.516). If we apply a conservative monetary value of a QALY of €50,000,⁷¹ which is lower than the amounts resulting from the literature we discussed in Section 4.2, pain and suffering damages can be calculated as follows. Every year, the paralysis has lowered the quality of life of the victim by 0.384 QALY, which in monetary terms equals €19,200 (0.384 * €50,000). Assuming an average life expectancy of 78 years, a 25-year old victim has 54 years of remaining life expectancy. The pain and suffering damages hence are calculated as the net present value of 54 payments of €19,200, which amounts to €439,000. This is substantially higher than the amounts most often awarded by the Dutch, German and Greek courts.⁷² The highest German amount is well in line with the proposed approach, if one takes into consideration that the victim there was even younger and that we use a low monetary value of €50,000. The Italian amount in our view seems too high.

5.2.2 Loss of an Eye

Pain and suffering damages for the loss of an eye greatly differ per country. In the Netherlands the amounts are about €2,000. Italy and Greece granted the highest amounts (€80,000 and €88,000 respectively), Austria the lowest (€14,500).⁷³ The amounts granted however greatly differ per case. For example, in Germany a woman who suffered from inflammation of the cerebral membrane due to her contact lenses and was blinded to one eye received €20,000 in pain and suffering damages.⁷⁴ On the other hand, a 12 year old boy lost an eye in an accident in which he was found comparatively negligent for 1/3 and he received €125,000.

⁶⁸ Savona Court of First Instance, 29 July 2005, online in De Jure:

<http://dejure.giuffre.it/psixsite/PaginePubbliche/default.aspx>

⁶⁹ C.C. Blackmore et al., 'Cervical Spine Screening with CT in Trauma Patients: A Cost-effectiveness Analysis', *Radiology* 1999, p. 117. The quality of this research is a 5.5 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=1999-01-02064>.

⁷⁰ Blackmore et al. 1999, p. 121, 122.

⁷¹ We have chosen to apply this low estimate of €50,000 to reduce the risk of overestimation of pain and suffering damages. As will become apparent in the remainder of the paper, the calculated amounts are already (much) higher than the amounts currently awarded in most countries. Given the possible problems in applying monetized QALY values in tort law, which we have discussed in the text above, we want to avoid the possible risk of overestimated damages. By applying a very low estimate of €50,000, our plea to substantially increase pain and suffering damages cannot be rejected by arguing that we have chosen a too high money value for a QALY.

⁷² If one also wants to incorporate a normal expected worsening of health over time, the QALY decrease in later years will be lower, resulting in a lower final amount.

⁷³ For Italy and Austria see Lindenbergh 2006, p. 10. For Greece see the published court decisions online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

⁷⁴ Jaeger and Luckey 2008, p. 411.

The fact that he has lost an eye at such a young age, which forces him to constantly be careful in order to protect his remaining eye, has increased the award granted.⁷⁵ In Greece, a 43 year old mother of two received about €88,000 in pain and suffering damages for complete loss of vision in her left eye.⁷⁶ In another case, €80,000 was awarded to a 36 year old man who was injured to one eye by a flare and lost 80% of his vision⁷⁷. However, a 46 year old man whose left eye was destroyed after someone kicked him in the face only received about €29,000.⁷⁸ We did not find a QALY weight for the loss of an eye as such, but there is relevant information to be found in other research. In a publication from 2003, a cost-utility analysis of cataract surgery in the second eye after a successful treatment of the first eye is carried out.⁷⁹ Earlier research already showed that surgery to the first eye is very cost-effective.⁸⁰ Furthermore, different research suggests that the quality of life in patients with bilateral good vision is substantially higher than that of patients with unilateral good vision.⁸¹ Hence, this research provides information on the difference in QALY value between sight with one eye and with two eyes. The total QALY gains of cataract surgery to the second eye per patient are estimated at 1.31 QALY,⁸² which would result in €65,500 if the conservative value of €50,000 per QALY would be used. It is important to note that this cataract research regards older people, who had a remaining life expectancy of 12 years. For younger victims with a longer remaining life expectancy, the total QALY gains will be proportionally higher. The already mentioned literature which compares the quality of life between unilateral and bilateral good vision suggests a difference of 0.08 QALY. We use this QALY-difference of seeing with one eye and seeing with two eyes as an estimate for the loss of the quality of life if one loses sight in one eye. Hence, for a person with a remaining life expectancy of 36 years and a QALY loss of 0.08 per year, pain and suffering damages would result in about €79,000.⁸³ Due to the relative low estimate of €50,000 per QALY, the resulting amounts are still relatively low, but substantially higher than in most European countries, apart from Italy and Greece. What is observable in case law, is that age of the victim indeed seems to have an influence. In the German cases, the young age of the victim was explicitly mentioned as a reason to increase the amount of damages. Also in several Dutch cases, the court refers to the young age of the victim.⁸⁴

⁷⁵ Jaeger and Luckey 2008, p. 423.

⁷⁶ Simvoulis tis Epikratias (Council of State) 2739/2007, online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

⁷⁷ Athens Administrative Court of First Instance 3441/2006, online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

⁷⁸ Dodekanese Court of Appeal 307/2005, online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

⁷⁹ B.G. Busbee et al., 'Cost-Utility Analysis of Cataract Surgery in the Second Eye', (110) *Ophthalmology* 2003, p. 2310-2317. The quality of this research is a 4.5 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=2003-01-00510>.

⁸⁰ B.G. Busbee et al., 'Incremental Cost-effectiveness of Initial Cataract Surgery', (109) *Ophthalmology* 2002, p. 609.

⁸¹ M.M. Brown et al., 'Quality of Life Associated with Unilateral and Bilateral Good Vision', (108) *Ophthalmology* 2001, p. 645.

⁸² Busbee et al. 2003, p. 2313.

⁸³ The net present value of 36 payments of €4,000 ($0.08 * €50,000$), applying a discount factor of 4%, equals €78,658.

⁸⁴ Lindenbergh 2006, p. 76 ff.

5.2.3. Deafness

The highest amounts in pain and suffering damages for ear injuries in the Netherlands are about €42,543 and €61,828 for severe deafness to both ears with a child aged 5 and a baby due to medical treatment.⁸⁵

There is extensive cost-utility research regarding cochlear implants, which are hearing devices which are implanted in the inner ear, as opposed to the more traditional acoustic hearing devices. In this research, it is investigated whether these cochlear implants increase the quality of life enough to be worth their additional costs. Summerfield et al. investigated whether bilateral cochlear implants rather than unilateral implants are cost-effective.⁸⁶ The benefits of *unilateral* cochlear implants include enhanced social and professional participation for adults and increased integration in mainstream education for children. Cochlear implants do not only benefit patients with whom acoustic hearing devices did not work (the ‘traditional candidates’), but also improve hearing of patients who already benefited from acoustic hearing devices (the ‘marginal hearing aid user’). *Bilateral* implants improve the ability to understand speech in noise and to locate sources of sounds. In the research, the Mark II Health Utilities Index was used to measure utilities. The research found that the QALY loss as result of profoundly impaired hearing (and related, speech) is 0.281 for traditional candidates and 0.145 for marginal hearing aid users.⁸⁷

Again assuming a value of €50,000 per QALY, deafness on both ears would then be assessed at about €14,000 per year for those who do not benefit from acoustic devices, and €7,250 for those who do. For the two Dutch cases, again assuming a life expectancy of 78 years, this would result in amounts of about €345,000 if acoustic devices do not benefit the patient and €178,000 if they do.⁸⁸

5.2.4 Amputation of foot and lower extremities

It is difficult to assess the pain and suffering damages for amputation of the foot or lower extremities, because in many cases the victim also suffered other injuries. In the Netherlands,⁸⁹ a 31 year old motor driver was involved in a traffic accident which resulted in the amputation of his lower leg. He has received almost €56,000 in a settlement. A 54 year old woman who

⁸⁵ ANWB Smartengeld, p. 81.

⁸⁶ A.Q. Summerfield et al., ‘A Cost-Utility Scenario Analysis of Bilateral Cochlear Implantation’, *Archives of Otolaryngology Head & Neck Surgery* 2002, p. 1255-1262. The quality of this research is a 5.0 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=2002-01-00877>.

⁸⁷ Summerfield et al. 2002, p. 1259. Research that focused on older patients found a mean increase in utility of 0.24. This overall increase is based on the HUI-3 and consists of +0.15 (hearing), +0.11 (emotion), +0.02 (speech), -0.01 (ambulation), -0.01 (cognition) and -0.01 (pain). See H.W. Francis et al., ‘Impact of Cochlear Implants on the Functional Health Status of Older Adults’, (112) *The Laryngoscope* 2002, p. 1484. The quality of this research is a 4.5 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=2002-01-00969>. Research that, to the opposite, focused on children, found increases in utility ranging from 0.22 to 0.39, depending on the method used (time trade-off, visual analogue scale or HUI-3). See A.K. Cheng et al., ‘Cost-Utility Analysis of the Cochlear Implant in Children’, *The Journal of the American Medical Association (JAMA)* 2000, p. 855. The quality of this research is a 5.5 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=2000-01-02130>.

⁸⁸ Please note that the UK Cochlear Implant Study Group, ‘Criteria of Candidacy for Unilateral Cochlear Implantation in Postlingually Deafened Adults II: Cost-Effectiveness Analysis’, (25) *Ear and Hearing*, p. 342 applied a discount factor of 6%, which would lead to amounts of €245,000 resp. €127,000. This is still significantly higher than the amounts granted in most countries. The quality of this research is a 6.0 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=2004-01-00225>.

⁸⁹ ANWB Smartengeld, p. 43.

was overrun by a garbage truck had her left leg amputated just above the knee. She received about €45,500 in pain and suffering damages. In Germany, a trolley driver received €12,500 regarding amputation of the forefoot in a case in which he was 50% comparatively negligent.⁹⁰ In a case in which a young woman was involved in a motor accident and had her lower leg amputated, pain and suffering damages were set at €40,000.⁹¹ In Greece, €50,000 was awarded to a 27 year old man after a car accident which resulted to the amputation of his leg just below the knee.⁹² In another traffic accident case, a minor received €170,000 in pain and suffering damages for having her left leg amputated just below the knee.⁹³ However, the court only granted about €58,700 to a 32 year old man who was involved in a work related accident and had his lower leg amputated.⁹⁴ In Italy, a man received €135,000 in pain and suffering damages for amputation of his foot after an accident.⁹⁵

In health economic literature regarding foot ulcers, relevant information on the impact of a foot amputation on the quality of life can be found. Increasing preventive efforts in diabetic patients can lower the probability of foot ulcers and amputations, and the research investigates whether these benefits are worth the costs.⁹⁶ Information is provided on the quality of life as indicated by people without foot ulcers, patients with ongoing foot ulcers, after primary healing of a foot ulcer, after healing with minor amputation and after healing with major amputation. A possible problem with using this information is that it is all related to people with a foot ulcer before an amputation. Nonetheless, it may be instructive to review the information. The difference in QALY value between people with no ulcer and people who have healed with major amputation is 0.49.⁹⁷ In order to better focus on the impact of the amputation itself, it is in our view better to compare the QALY value of the latter group with those after primary healing of a foot ulcer, and then the difference is 0.29.

In another research it was investigated whether compression stockings in patients with chronic venous stasis are a cost-effective instrument in reducing the probability of recurrence of ulcerations. In that research, the decrease in utility due to amputation of lower extremities is assessed at 0.26.⁹⁸

Yet another research regards limb-threatening ischemia. The decrease in utility of patients due to amputation of lower extremities who were still ambulant after the amputation ranges from 0.3 to 0.35, depending if it is compared with the utility of patients who were cured after revascularization or with patients who were only cured after multiple revascularization.⁹⁹ The amputation may regard more than just the foot, which may explain the higher QALY loss.

⁹⁰ Jaeger and Luckey 2008, p. 779.

⁹¹ Jaeger and Luckey 2008, p. 776. The plaintiff claimed €50,000 but because of the poor financial situation and the lack of insurance of the injurer, who was the boyfriend of the victim, the court only granted €40,000.

⁹² Drama Court of First Instance 124/2004, online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

⁹³ Thessaloniki Court of Appeal 2601/2006, *Armenopoulos* 2007, p. 1921.

⁹⁴ Areios Pagos (Supreme Court) 961/2007, online in NOMOS: <http://lawdb.intrasoftnet.com/index.php>.

⁹⁵ Corte di Cassazione (Highest Court of Appeal) n. 25751, 24th October 2008, online in De Jure: <http://dejure.giuffre.it/psixsite/PaginePubbliche/default.aspx>

⁹⁶ See e.g. G. Ragnarson Tellvall and J. Apelqvist, 'Prevention of diabetes-related foot ulcers and amputations: a cost-utility analysis based on Markov model simulations', (44) *Diabetologica* 2001, p. 2077. The quality of this research is a 5.0 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=2001-01-02190>.

⁹⁷ Ragnarson Tellvall and Apelqvist 2001, p. 2079. Also see G. Ragnarson Tellvall and J. Apelqvist, 'Health-related quality of life in patients with diabetes mellitus and foot ulcers', (14) *Journal of Diabetes and Its Complications* 2000, p. 238.

⁹⁸ P. Korn et al., 'Why insurers should reimburse for compression stockings in patients with chronic venous stasis', (35) *Journal of Vascular Surgery* 2002, p. 952. The quality of this research is a 5.5 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=2002-01-01030>.

⁹⁹ T.E. Brothers et al., 'Justification of intervention for limb-threatening ischemia: a surgical decision analysis', (7) *Cardiovascular Surgery* 1999, p. 65. The quality of this research is a 4.5 on a scale from 1.0 to 7.0, see <https://research.tufts-nemc.org/cear/search/detail.aspx?ArticleId=1999-01-02038>.

If we would again apply the €50,000 monetary value of a QALY, again it becomes clear that the amounts granted for pain and suffering damages in the cases discussed are too low from an economic point of view. Using a 0.26 QALY decrease, which is the lowest from the research we have discussed, an amputation in a 54 year old victim would result in about €11,000. That amount would be even higher for the younger victims from our example.

6. Conclusions

The conclusion from the above analysis is that pain and suffering damages as awarded in legal cases are too low from an economic perspective. It is not possible to exactly calculate the correct magnitude of those damages, first because there is no consensus over the monetary value of the QALY, VSL or VSLY. Second, there are different ways to assess the relative weight of different health impairments, leading to diverging results. Third, QALYs are intended to evaluate different health programs, treatment methods and techniques regarding their cost-effectiveness, not to calculate damages. Notwithstanding these caveats, we still think that using the information that can be derived from QALY studies is a better method to determine pain and suffering damages than merely looking at the amounts that were granted in the past. After all, those amounts provide no indication regarding the correctness of the magnitude, because that requires an external framework. By basing our calculations on a very conservative estimation of the monetary value of a QALY (€50,000), we feel that the resulting amounts do not lead to an overestimation of the immaterial losses. This holds even more as we apply a relatively high discount factor of 4%. Further developments in health economic literature in our view therefore will more likely lead to upward adjustments of the resulting amounts than downward.

In order to be able to reach the prevention goal as defined in the Law and Economics literature, increases in pain and suffering damages are required, because the injurer with the current amounts does not fully internalize the externalities caused by his activities. The legal compensation goal is also served by such an increase. After all, if damages should aim at restoring the balance,¹⁰⁰ they should express the gravity of the losses caused by the injurer. In as far as independent weight is attached to the goal of appeasement, pain and suffering damages should also be based on the gravity of the immaterial losses. Hence, both from a legal as from a Law and Economics point of view, the magnitude of pain and suffering damages should be increased.

If the pain and suffering damages would indeed be increased, insurance premiums will rise because the coverage has to be extended. Would this lead to the situation where activities become too expensive and people are covered against immaterial losses against their will? In our view not. First, the resulting amounts are based on the expenses a potential victim would be willing to make in order to reduce the probability of these losses occurring. This does not lead to a higher coverage than he would have wanted to take himself. Second, in the current situation the opposite situation exists: because immaterial losses are not fully incorporated into the damages, many activities which cause losses are too cheap and are therefore carried out too often.

The increase in insurance premiums in our view will not lead to uninsurability. That problem is not primarily caused by the *size* of the covered amount, but rather by the uncertainty of the expected risk.¹⁰¹ Economic insights may lead to a better predictability of the magnitude of

¹⁰⁰ Which, according to Lindenbergh 1998, p. 34 is the purpose of compensation..

¹⁰¹ M. Faure, 'The View from Law and Economics', in: G. Wagner (ed.), *Tort Law and Liability Insurance*, Vienna: Springer 2005, p. 251, 252.

pain and suffering damages, which would lead to better assessment of the expected risk than in the current situation.

Much additional research is needed to provide more clarity regarding the way in which information from cost effectiveness research of health care can be utilized in tort law, regarding the assessment of QALY weights, the choice between QALY and VSL(Y), the possible problem that QALY research regards *improvements* in health due to medical treatment whereas tort law regards *decreases* in health due to accidents,¹⁰² insights from research regarding adaptation,¹⁰³ *et cetera*. Refining the answers to these questions enables a better assessment of the ‘correct’ magnitude of pain and suffering damages. We hope that our paper has already made clear that, from a legal point of view as well as from a health economic and Law and Economics perspective, enough reasons exist to regard the current amounts as too low and hence to increase the magnitude of pain and suffering damages in the future.

¹⁰² This may be relevant due to the issue of *loss aversion*, which implies that risk averse people weigh a loss of a certain size more heavily than a gain of the same size. If this would be taken into account, the QALY values used may still be an underestimation of the losses.

¹⁰³ This research suggests that people have a great capacity to adapt to their situation. This could imply that the utility loss due to deterioration in health decreases over time, because people adapt to e.g. their disability. This issue could be incorporated by e.g. choosing a higher discount factor, or by only using QALY values which are based on patient reports rather than on reports by medical experts or volunteers. After all, the patients may provide assessments in which the adaptation is already incorporated.