

INFORMED CONSENT

We're reasonably good at the 'consent' part – i.e. asking patients to give the 'go ahead' before doing a procedure or obtaining their signature on a consent form and so on ... BUT we are NOT quite as good at the 'informed' part.

I compiled this document to provide patients with evidence-supported information about the risks of physiotherapy procedures.

So.. this document is the 'informed' part of your 'informed consent' -

What are the benefits of Physiotherapy?

Are there risks associated with physiotherapy treatment?

How do these risks compare with the risks attached to interventions that patients might choose *instead* of physiotherapy?

Risks are not easy to visualise and bluntly stating “raw” risks is not nearly as informative as putting them in CONTEXT. So, I've tried to provide CONTEXT, or a SCALE for the risks of physiotherapy procedures so that my patients can compare them to the risks attached to other treatments or even to events like the chances of winning an Olympic medal or of being hit by lightning.

What does Physiotherapy do for you?

1. If you have ***pain***, the goal of physiotherapy is to ***reduce it*** and help you to ***manage*** it
2. We aim to ***restore physical function*** – in other words, to help you ***DO*** the things ***you*** want to do in your daily life. For some patients, “function” might mean participating in a sport or some other physical activity, or it might mean housework. For others, it means hiking, walking the dog, playing golf, or simply being able to play with the kids, sit watching TV in the evening, or just get a sound night’s sleep.
3. ***Education*** – we educate patients about things like pain, movement, alignment [‘posture’], tissue healing, function, ergonomics and training.

We do some other things, but that’s enough to begin with.

Benefits of Physiotherapy

You get:

1. A detailed assessment and an explanation of your problem
2. Increased range of motion
3. Easier movement
4. Increased strength and muscular endurance

5. Reduced pain
6. Increased endurance
7. Improved balance and co-ordination
8. Gradual, expertly supervised recovery from infirmity, injury or surgery
9. You learn:
 - how to manage re-injuries, recurrences and chronicity
 - about pain, disability, recovery, tissue healing
 - about ergonomics, efficient movement, posture/'alignment'
10. Restored confidence in your physical function; improved physical independence

Physiotherapy - 'One-Stop-Shop' for Physical Rehabilitation

No other clinician has a Physiotherapist's skills and training in the field of ***physical rehabilitation***. While some other clinicians or trainers may have some skills similar to those of a Physiotherapist, **ONLY** a Physiotherapist has the full complement of skills and training to meet your rehabilitation needs.

Why is this important?

A Chartered Physiotherapist is trained to assess and treat physical impairments¹ and to optimise the physical function of patients with the full spectrum of injury and disease. That is why a physiotherapist's training is so comprehensive.

Patients often come to us with a problem that they believe is due to a musculoskeletal injury, but during the assessment it becomes clear that it is really due to a problem with the heart, lung, kidney (or other) organ, or a problem with their nervous, respiratory, immune or cardiovascular system.

Here are two examples to illustrate the difference:

“I have a pain in my back” - in a small percentage of cases, this ‘back pain’ is not due to a disc problem or a ‘pulled back muscle’ but is due to a problem in the kidney or bowel.

“I have a pain in my shoulder” – of course this can be due to musculoskeletal causes like neck problems, muscle trigger points, nerve irritation, shoulder injury or arthritis – but it can also be caused by problems with the spleen, diaphragm, gall bladder, lung or heart.

In the sphere of physical rehabilitation Chartered Physiotherapists have the training and experience to differentiate between these diverse presentations. The ability to do this is very important – it could save you months of unnecessary and ineffective (and costly) treatment.

Not only can we assess, diagnose, treat, educate and advise, but we can teach you how to move and to strengthen, stretch, re-train and condition your muscles. We can directly manipulate your joints and soft-tissues, and optimize your alignment and movement patterns. If necessary, we can also fabricate customized splints and foot orthotics, apply support tape and fit you for assistive devices like crutches, zimmer frames and ‘rollators’.

What is the advantage of this comprehensive skill set?

Well, if the only tool you have is a hammer – everything quickly begins to resemble a nail. Physiotherapists have the complete ‘tool-kit’ and we can select the ‘tool’ most likely to help you with your specific problem.

¹ Impairments: e.g. weak muscles, tight muscles, ‘stiff’ joints, poor balance/co-ordination

Risks of Physiotherapy

Risk's Real-Life "Bottom Line" – Insurance Premiums

The size of a clinician's insurance premium is a good measure of how risky his/her treatments are considered to be. Insurance companies allocate considerable resources to monitoring treatment outcomes and establishing *relative risk*, and then they use these risk estimates to calculate a clinician's insurance premiums.

There are many good reasons ... rational, mathematical, actuarial and scientific reasons ... why Physiotherapists' insurance premiums are miniscule. Our premiums are low because our treatments have been shown to be *very safe*.

Got Evidence?

Yes

In addition to our low insurance premiums, scientific evidence also strongly supports the argument that a Physiotherapist is *one of the safest clinicians* to attend for treatment – if you are not persuaded by scientific research, ask the actuarial staff in any insurance company that insures medical professionals and other clinicians. Serious adverse consequences *rarely* follow physiotherapy treatments – the most common after-effects are temporary muscle soreness (usually from doing 'new' exercises) or as a consequence of deep soft tissue work, dry needling or joint manipulation.

Patients who have been treated with dry needling sometimes experience other side-effects. The most common one is soreness in the area that was needled. This is transient (lasts a day to a day-and-a-half); it is usually mild, and you can ease it with moist heat (e.g. a hot water bottle) or even an analgesic if you are accustomed to them. Others experience what we call 'autonomic side effects' such as tiredness, thirst, hunger, increased local sweating – these too are usually mild and transient.

Manual therapy techniques to the spine can have adverse effects such as increases in symptoms, new symptoms, strains, sprains, blood vessel damage that could lead to neurological problems like stroke, TIA's and so on. These latter consequences are *extremely rare* – especially when compared to the risks associated with treatments you might choose *INSTEAD* of Physiotherapy such as *medications* (even common medications like anti-inflammatories), *injections* and *surgery*. In many cases, cycling *to the clinic* would carry more risk than the physiotherapy treatment you have when you get there!

If you more information about this topic, I have gone into it in more detail later on in this document.

The techniques used by physiotherapists include mobilization and manipulation of the spine, and also traction, massage, stretching, home exercises or even gym programmes. These treatments can lead to a very rare type of stroke – but this kind of stroke can also happen during normal every-day activities such as swimming, gardening, sports or even at rest. Serious side effects are **extremely rare** after these treatments, and your physiotherapist **is** aware of them, and s(he) takes appropriate steps to reduce them to an absolute minimum.

The scientific research has shown that the risk of serious complications such as cardiovascular (e.g. heart attack, stroke) or serious neurological events after physiotherapy treatment **is much lower** than the risks accompanying medical treatments (like neck joint injections, ‘epidurals’ or surgery) that a patient might choose **instead** of physiotherapy. On average, you are more likely to be struck by lightning or win an Olympic medal than to suffer anything as serious as this after a physiotherapy treatment (for CONTEXT/comparison, see ‘Risk List’ at the end of this document – you can easily confirm these risk estimates online).

Treatment ‘soreness’

Increase in pain is usually considered to be an ‘adverse response’ to treatment. This sometimes happens, but it should not be confused with an increase in damage. For example, we use dry needling and muscle and joint manual therapy techniques as part of our treatments. These methods sometimes result in a temporary increase in discomfort; they can even give you a ‘new discomfort’ – patients often compare it to ‘a hard workout’. But the additional discomfort, like the soreness one might get from doing a new exercise or an unaccustomed activity such as gardening, usually wears off in a day or two. After this, the gains obtained from the treatment usually become apparent.

Similarly, surgeons often regard discomfort after a surgical procedure and an integral part of the surgery: a ‘consequence’ of the surgery rather than a so-called adverse side-effect. It is possible to minimize this discomfort using medications, and very few patients wake up from surgery **entirely** pain-free.

What Treatments Could I Get INSTEAD of Physiotherapy?

Are THEY risky?

It is important to remember that treatments you might opt for **INSTEAD of physiotherapy** can also have significant adverse (or even dangerous) side-effects. In many cases they are **more risky than physiotherapy**. MEDICAL interventions may

be followed by increased symptoms or new symptoms, organ damage or adverse reactions to medications, injections, joint or 'nerve' 'procedures' and surgery. Such side-effects may include pain, infection, stroke, heart attack or even death.

Scientific research suggests that many medical treatments and surgical procedures can expose the patient to **more risk** than physiotherapy treatments. You might be surprised to read this but it is scientifically verifiable.

In order to help you make an informed decision, your doctor, specialist or surgeon will inform you of the risk of the procedures **they** offer, just as I am doing here.

The Risk-Free Treatment

Is **ANY** treatment completely risk-free?

The answer to this, in most instances, is probably "No".

It is rare for a treatment, medical, surgical or otherwise, to have no risk associated with it – even over-the-counter medications carry risk.

"Maybe I won't have ANY treatment at all then."

Is there risk in NOT being assessed and treated?

In **SOME** cases the answer to this is 'no'? Some people just get better on their own. And this is good.

Many of our patients have already waited weeks, months or even years for their problem to vanish naturally **before** attending our clinic for help. Some are not prepared to put up with their pain or disability for any longer, and decide to seek help.

But, sometimes **there ARE drawbacks in not seeking help for a problem – not being treated exposes you to risks too.**

The problem **may get worse** if left untreated – it may even cause other problems.

Assessment often unearths serious **pathology** [injury, infection, disease] that you did not know was there – serious problems can sometimes mimic common aches and pains.

Some serious problems are very subtle – patients ‘know’ something is wrong, but can’t ‘put their finger on it’ – they come to us for assessment, examination, advice and reassurance, or to be referred on to someone who can assess them further.

Patients may self-medicate for years rather than have the problem properly assessed and treated... prolonged ingestion of some medications can lead to side-effects, organ damage and ongoing tissue damage.

Do I really NEED treatment?

How does an average person **know** when their problem should be assessed and treated and when it can be safely ignored?

In the vast majority of cases – **they don’t know**. That’s why they come to us for assessment.

My policy, at this clinic, is that **IF** you do **not** require Physiotherapy treatment for your problem, I will tell you after your assessment.

This policy might be ‘bad for business’, but it’s **GOOD** for you.

And it helps me sleep at night.

Does *everyone* get better with Physiotherapy?

No.

No matter what you might hear from Dr. Google, there is **no** treatment that completely 'cures' **EVERY** patient – the same can be said for medical treatments, acupuncture, medications, hypnotherapy, massage therapy, injections and even surgery.

Many physiotherapy patients DO get 100% relief with absolutely no sign remaining of their initial problem.

Others get less than 100% benefit, but they improve sufficiently that they are able to return to their normal lives with little or no problem. **Most** patients learn valuable skills and knowledge to help them manage their condition if it recurs.

Teaching patients how to manage recurrences is a very important part of the physiotherapist's job.

Some patients use physiotherapy for **maintenance** – just as some take medications for months/years, or see a chiropractor, massage therapist or an acupuncturist 'long term'. Some of our patients come to us for a maintenance visit once a month, or for a few visits, once or twice a year – and there is nothing wrong with this. Everyone's problem is unique.

What if I don't get better? As soon as it becomes apparent that you are not responding to your physiotherapy programme, **we will help you** find a clinician who may be able to help you. This might take the form of recommending additional medical assessment (e.g. x-ray, MRI, CT, 'blood tests') or a clinician with additional skills and knowledge relevant to your particular problem like a 'jaw-joint' [TMJ] specialist, neurologist, rheumatologist, orthopaedic consultant and so on.

MORE EVIDENCE – the 'informed' part of Informed Consent

"That which **can** be asserted **without evidence**, can be dismissed **without evidence**." Christopher Hitchens.

Some Research Findings

For example, a recent (Gouveia, 2009) systematic review in the *medical* journal *Spine* summarized the risks of HVLA² thus:

“ ... the frequency of serious adverse events varied between 5 strokes/100,000 manipulations to 1.46 serious adverse events/10,000,000 manipulations and 2.68 deaths/10,000,000 manipulations”

This means that, assuming a practitioner does 5 neck manipulations per day for 50 weeks of the year, it will take up to **8,000 years** to do ten million manipulations (HVLA's). Yes, that really DOES say 8,000 **years**!

A Canadian study, again discussed below, counted 23 vertebral artery strokes “after” 135 **Million** neck manipulations. This yielded a ratio of approximately 1 vertebral artery dissection for every 6,000,000 manipulations – the dissections occurring **after** chiropractic manipulation³ (Haldeman et al., 2002 (2)). Because such large numbers of patients are involved here and phenomena like the ‘post hoc ergo propter hoc’ error⁴, it follows that the real number of dissections occurring **because of** the chiropractic neck adjustment MUST be fewer than one in **six MILLION**.

One 2008 study summarized the risk of HVLA thus: for every **100 thousand** people under 45 years old who have spinal manipulative therapy, within one week of manual therapy, 1.3 of them will have a vertebral artery dissection that can **reasonably** be attributed to the manual therapy. The risk is **lower** in people over 45

“The best available estimate of incidence is approximately 1.3 cases of VAD or occlusion attributable to CMT for every 100,000 persons <45 years of age receiving CMT within 1 week of manipulative therapy.” Miley et al. 2008.

Why do manual therapists argue that HVLA's rarely cause serious side effects, while some doctors seem to believe they happen every second Tuesday? Is there a bias built into the reporting system?

Short answer? It certainly seems so – do I have evidence of this bias? Yes.

I have hinted at ‘psychosocial’ factors that might explain the disparity between the

² A ‘HVLA’ or high velocity, low amplitude manipulation is a maneuver in which the therapist performs a small amplitude, quick movement of the joint. Chiropractors call this an ‘adjustment’, most physiotherapists call it a ‘manipulation’ or ‘manip’ for short. It usually results in a ‘popping’ or ‘clicking’ sound.

³ You’ve already guessed that the number of dissections actually caused by the chiropractic manipulation must be less than 23.

⁴ When two events occur, one after the other in time, you cannot assume that the first even caused the second. To do so is the ‘post hoc ergo propter hoc error’ – it is extremely common.

measured and objective reactions of physicians and surgeons to serious (and relatively frequent) adverse side-effects of their **own** interventions, and the more strident responses when they discuss comparable (but rare) side-effects associated with manual therapy procedures – particularly when those carried out by chiropractors. Most practitioners who **perform** HVLA's have the impression that serious side-effects like dissections are **rare**, (and the scientific and medical research supports this stance) but it seems neurologists (and by association, physicians) believe they are common. Why?

Haldeman et al. (Spine Journal, 2002) provide evidence to support the argument that **referral bias** plays a significant role in this disparity. These authors used data from the insurance company that covers 85% of the Chiropractors in Canada (CCPA) to assess the number of vertebral artery dissections that occurred after chiropractic treatment between 1988 and 1997. They calculated that during this period almost 135,000,000 cervical adjustments were carried out in Canada, and a total of **23 vertebral artery dissections were associated with them**. This yielded a ratio of approximately 1 dissection per 6 Million adjustments and **none were fatal**.

They counted the number of practicing chiropractors and neurologists during the period and calculated that, **during their practice lifetime**, 1 of every **48** chiropractors and one of every **two** neurologists would have been made aware of a vascular complication from cervical manipulation. When patients experienced a dissection after a chiropractic procedure, though s(he) was treated by **a single** Chiropractor, they were subsequently seen by (an average of) **3 Neurologists**. In fact, ***EACH of the 23 patients was seen post-dissection by an average of 9.3 DIFFERENT physicians, three of which were neurologists***. Some of the 23 patients were seen by 6-10 different **neurologists!** It is likely that one or more of the 216 physicians involved with these 23 patients presented the dissection case at meetings or Grand Rounds – or even published the case. It is hard to deny that this 'magnifier effect' would give physicians the impression that dissections are more common than they actually are.

That last paragraph merits re-reading.

Naturally not all serious side-effects of chiropractic are reported – but as we have seen above, this is not confined to the Chiropractic profession – reporting rates of serious medication side-effects can be as low as 1%, so there's no reason for complacency, or smugness (Van der Hooft, et al., 2006, Patel et al., 2007).

Can you help me put risk in perspective?

It is very difficult to put odds and risk in perspective.

It is even difficult to read and compare articles about treatment risk. At the end of this booklet - I have listed the odds and risks of events like winning an Olympic Gold medal just to give the following numbers some context⁵.

Compare the *scale* of **HVLA** risk to the risk of taking *prescription medications*⁶ – in one study by Kongkaew et al. 2008:

“Approximately **5.3% of hospital admissions** were associated with adverse drug reactions (ADR)”

This is **not** a freak finding – a later study put the estimate for the number of emergency hospital admissions attributable to adverse **drug** reactions (ADR) at 5.8% (Brvar et al., 2009).

So, overall, at least one twentieth of **ALL** hospital admissions are due to adverse responses to medications.

But this is not the entire story about ADR's – this is probably an **underestimate** as the majority of adverse drug reactions go UNRECORDED, so it seems that the ACTUAL contribution of prescribed drugs to **emergency hospitalizations** is **much greater** than estimated from reviewing the medical literature (Van der Hooft, et al., 2006, Patel et al., 2007)

“Only approximately **1%** of the coded ADRs causing hospitalisation were reported to our national centre for spontaneous ADR reporting.”

YES... that really DID say 1%

“HOW ABOUT THOSE SLOW ‘MOBILIZATIONS’, instead of a ‘manip’ [or HVLA]?”

The **research** suggests that it is **not possible** to predict that an adverse reaction will occur after a HVLA (Haldeman S et al. 2002). These authors concluded:

⁵ Journalists appear to be particularly poor at accurately portraying ‘risk’: I’m not entirely convinced that this is accidental. Many years ago I came across a dramatic headline emblazoned across a newspaper. It went something like this: “New drug **DOUBLES** the risk of cervical cancer compared to the older drug”. What was not explained in the headline or in the text was that the ‘old’ drug exposed the patient to a 1:500,000 additional risk of cancer... and the new drug doubled this risk to 2:500,000. Both of these figures **SHOULD** have been compared to the risk of the same cancer, in the same age group, in people who were not taking either the new or the old drug.

⁶ Or... think of it this way: if 100,000 people have joint injection in their neck – how many can be expected to have a serious adverse event afterwards that is attributable to the procedure? **Do you know? If you don’t know, then how can you recommend a joint injection rather than manual therapy on the grounds of patient safety?**

“Cerebrovascular accidents after manipulation appear to be unpredictable and should be considered an inherent, idiosyncratic, and *rare* complication of this treatment approach.”

It's **NOT just ‘manipulations’** – there are risks associated with ‘mobilizations’ too – (the Grade I-IV mobilisations⁷)

“These strokes were noted following ANY form of standard cervical manipulation technique including rotation, extension, lateral flexion and non-force and neutral position manipulations.”

Yes, “ANY FORM”: that DOES mean ‘stretches’ and ‘traction’ are NOT GUARANTEED “SAFE”.

In fact, in one IRISH STUDY, ***more*** patients experienced adverse effects after ***low speed*** (so-called) MOBILIZATIONS than after HVLA!! (Sweeney & Doody, 2010).

So, if you as a doctor/surgeon are ‘advising’ a physiotherapist to ‘JUST DO MOBS – no manipulations’ – where did you get your evidence?

“MAYBE I SHOULD JUST GO TO MY GP THEN” – Is THAT perfectly SAFE?

“What’s the ‘risk’ of going to your GP with a headache or a sore neck⁸?”



According to some scientific evidence, it is just as “risky” to visit your GP as it is to have your neck treated by a chiropractor.

For example, one frequently cited article from the medical journal *Spine* found that those under 45 years old were more likely to have seen a chiropractor ***OR*** by a GP in the period ***BEFORE*** they had a stroke, BUT (and here’s the rub) there was ***no difference in the risk*** of stroke between the two groups (Cassidy et al., 2008 – key points below)

⁷ Physiotherapists who do manual therapy on joints grade the movements according to the amount of movement and the ‘force’ applied to the joint: they are graded I-IV. In a grade I movement [rarely used in practice], an extremely light force is applied to the joint and there is very little resulting movement. A grade IV movement [frequently used] employs significantly higher forces but there is also a very small displacement of the joint. Some manual therapists still refer to a manipulation as a Grade V but this nomenclature is problematic for various reasons, ***ONE*** of which is that it implies that even larger forces are being used [this is inaccurate: many so-called GV manipulations can be achieved with small to moderate forces]

⁸ In 80% of vertebrobasilar artery injuries headache and neck pain are early presenting symptoms Lee et al., 2006). The causal link between HVLA and arterial injury is VERY hard to ***establish*** unless you lower the standards required for proof. Hearsay is much easier.

■ **Key Points**

- Vertebrobasilar artery stroke is a rare event in the population.
- There is an association between vertebrobasilar artery stroke and chiropractic visits in those under 45 years of age.
- There is also an association between vertebrobasilar artery stroke and use of primary care physician visits in all age groups.
- We found no evidence of excess risk of VBA stroke associated chiropractic care.
- The increased risks of vertebrobasilar artery stroke associated with chiropractic and physician visits is likely explained by patients with vertebrobasilar dissection-related neck pain and headache consulting both chiropractors and primary care physicians before their VBA stroke.

“That which is offered without evidence, may be dismissed without evidence”

Let’s restate that, just to be sure you noticed it:



“... there was ***no difference in the risk*** of stroke between the “ group that attended a chiropractor for chiropractic treatment and the group that went to their GP for ‘standard medical treatment’.

Scientific research OFTEN comes up with unexpected and unwelcome results – that last statement merits re-reading.

“So, when you’re advising people that it is safer to go to a GP than a chiropractor with neck pain or headache – what are you basing this on?

Two things to think about:

1. Look again at the Miley et al. 2008 quote above:

“The best available estimate of incidence is approximately 1.3 cases of VAD or occlusion attributable to CMT for every 100,000 persons <45 years of age receiving CMT ***within 1 week of manipulative therapy.***”

In order to avoid the ‘*post hoc ergo propter hoc*’ fallacy, most of the more recent studies use this terminology – “within 1 week of manipulative therapy” and “in the period BEFORE they had a stroke”, or “after adjustment”. They don’t tend to state or imply that the HVLA ***caused*** the stroke? Why? Because the causal link is ***very*** difficult to establish, and they don’t want to indulge in ‘superstitious thinking’⁹. If a

⁹ For example: “I had 7 years bad luck after that mirror broke”. “My baby died the night after I saw that crone ululating and moaning incantations by the brook, in the moonlight, so she’s a Witch!”. Humans have always been very fond of superstitious thinking.

person experiences an adverse event **after** ANY treatment you must be very careful about stating that the treatment definitely caused the adverse event.

Some researchers have pointed out the obvious¹⁰: that neck pain and headache are common symptoms of dissection. It is likely that many patients who go to their GP **or** Chiropractor/Physiotherapist/Osteopath with headache or neck pain are ***already experiencing*** a dissection **before** their GP visit, or, more to the point, before their HVLA procedure. Thus neither the GP visit NOR the HVLA can be said to be the sole cause of the dissection (but of course, they **may** have precipitated or exacerbated an existing dissection – or did the patient drive over a speed ramp on the way to the clinic and THIS precipitated the arterial damage? Did they head the winning goal on the Saturday before their clinic visit?¹¹ No, I'm not joking).

“OR, MAYBE I SHOULD JUST HAVE ONE OF THOSE INJECTIONS ... THEY'RE SAFER, RIGHT?”

Well, let's see what the evidence says?

We know that the epidural injection is risky – ***including the risk of quadriplegia***. (Bose B, 2005)

A very recent review (Epstein, 2013) of the risks of transforaminal and epidural neck injections concluded with this:

“Although the benefits for epidural steroid injections may include ***transient*** pain relief for those with/without surgical disease, the multitude of risks attributed to these injections ***outweighs*** the benefits.”

After this extensive review of spinal injection therapy, the author concluded:

“Although not approved by the Food and Drug Administration (FDA), injections are being performed with an increased frequency (160%), are ***typically short-acting and ineffective over the longer-term, while exposing patients to major risks/complications.***”

Conjecture prompted by the evidence: (pursuant to Atiqi R et al, 2010)

¹⁰ Yes, I have a reference for this – Lee et al., 2006

¹¹ Have a look at the evidence: Werle et al., 2015

Studies support the notion that a risk may be attached to **all** medical and surgical consultations

RESPONSE:

Should a compulsory health warning be attached to **all** medical visits? Well, if you read the small-print on the information leaflet the package your medications came in, you will see that more or less all medical interventions DO in fact carry a 'health warning' – usually under the heading 'side-effects', 'adverse effects' or 'adverse reactions'.

All clinicians do their utmost to minimize risk to their patients.

“HOW ABOUT DRUGS THEN? Safe?”

This depends on what you mean by 'safe' and 'drugs'

I mentioned mortality related to prescription opioids above. (i.e. **NOT** illegally acquired opioids – that's another day's work).

It has been estimated that between 1 in 10 and 1 in 5 patients who take non steroidal anti-inflammatory drugs [NSAID's] experience problems in their gut (or 'gastro-intestinal system') and NSAID-associated upper gastrointestinal adverse events are estimated to result in 103,000 hospitalizations and **16,500 deaths per year** in the United States. Yes, that REALLY does say, 16,500 **deaths per year**. Despite the millions and millions of Chiropractic adjustments in the US every single year... how many people do Chiropractors kill? If Chiropractic killed as many people as NSAIDs – it would have been outlawed decades ago.

About 43% of drug-related emergency room hospital visits are due to NSAID use. Many of these events are avoidable; a review of physician visits and prescriptions estimated that unnecessary prescriptions for NSAIDs were written in 42% of doctor visits. (http://en.wikipedia.org/wiki/Non-steroidal_anti-inflammatory_drug - cite_ref-pmid11464731_14-1Green, Ga (2001). "Understanding NSAIDs: from aspirin to COX-2". Clinical cornerstone 3 (5): 50–60.)

Some authors (van der Hooft CS et al. 2006) emphasize that only a **small percentage** of adverse drug reactions are **reported** to national data bases (1% in this study). Read that again, in case you missed it (1%). Others have concluded that **studies funded by pharmaceutical companies** are less likely to report adverse effects than studies funded by other sources (Nieto et al. 2007 – inhaled steroids

study, but I bet I can dig up dozens of other studies with similar findings). No surprise there.

Even advising a patient to 'exercise' exposes them to risk – how large is this risk? Do you know? Does advising a patient to 'join a gym' or 'take up exercise' expose them to more risk than advising them to go to a chiropractor or a physiotherapist for a HVLA? Have you considered this?

THE SURGERY OPTION – safer than Physiotherapy?

No

Spinal surgery is a frequently chosen as an alternative to Physiotherapy for back or neck pain – how safe is spinal surgery?

Few patients realize that when they present to hospital for a spinal surgery they face a risk of infection, clot, bleed, stroke, TIA, neurological damage, or even death. Those who *are* aware that a risk exists are usually unaware of how significant this risk is. Some people for instance might forego a visit to a chiropractor (because of the 'risk') and opt for surgery instead. The research shows that the surgery is thousands of times *more* risky than the Chiropractic. In fact, with standard Chiropractic, the risk of infection for instance, is zero.

Bear in mind the small risks associated with Physiotherapy – even manual therapy treatments to the neck – that I listed above. The research shows that Physiotherapy methods are extremely safe compared to other treatment options such as injections or surgery.

Serious neurological events *after* manual therapy to the neck are extremely *rare* – of the order of one in a million to one in 10 million. Remember those numbers when you read the risks associated with spinal surgery from recent research.

Remember too, that spinal surgery is not always successful and it not always necessary.

A 2016 survey published in the prestigious New England Journal of Medicine cited a surgery mortality rate of 1.5 patients per 100 in an international sample of hospitals. With the implementation of a surgery safety/procedural checklist the surgery death rate was brought below 1% in their sample of hospitals.

Thus, the mortality rate for surgery seems to be about 1 in a 100. This mortality rate for surgery is between 1,000 and 100,000 higher than the reported mortality rate

for physiotherapy treatments. The rate varies widely because it depends on the research and the procedure.

N Engl J Med 2009; 360:491-499. January 29, 2009

Now, let's look at the risks associated with surgeries more relevant to Physiotherapy patients - taking spinal surgery as an example; specifically lumbar microdiscectomy (LD), anterior cervical discectomy and fusion (ACDF), and lumbar stenosis decompression (LSD) cases from 2004 to 2007

In 2011, Smith and associates published research in the journal Spine about infection rates after spinal surgery. The survey was based on 108,409 surgeries.

Overall, there was an infection rate of 2.1% but some rates were as high as 5% (that's 2 to 5 patients out of every 100 who undergo surgery). Infection rates varied depending on the procedures carried out and tended to be higher for revision surgery, use of implants and spinal fusion.

Spine: 01 April 2011 - Volume 36 - Issue 7 - p 556-563

In subsequent studies, the authors mined the same post-operative data to document the number of patients who suffered neurological damage ("new neurological deficit" or NND) after spinal surgery. Overall, 1% of patients suffered new neurological deficit after their spinal surgery. Rates tended to be worse with revision surgeries, cases using spinal implants and paediatric cases.

For **all** post-surgical injuries (nerve root, cauda equina and spinal cord) **less than 50%** of patients with ("new") post-surgical neurological injuries recovered fully in the long term.

In a third dredging of the same data by the same authors, Smith et al. (2010) investigated the incidence of 'thromboembolic' events (pulmonary embolism [PE] and DVT or 'clots') after spinal surgery. For assessment of PE and DVT, 108,419 cases were identified and rates were calculated per **1000** cases based on diagnosis, age group, and implant use. Overall rates of PE, **death** due to PE, and DVT were 1.38, **0.34**, and 1.18, respectively. Among 82,082 adults, the rate of PE, again, per 1000 cases, ranged from 0.47 for lumbar microdiscectomy to 12.4 for metastatic tumor. Similar variations were noted for DVT and deaths due to PE.

Spine, 15 November 2010 - Volume 35 - Issue 24 - pp 2140-2149

What does this mean?

It means that **34** patients in every 1000 **died** as a result of a thromboembolic event (PE) after spinal surgery.

It means that if a patient opts for surgery instead of Physiotherapy s(he) is automatically exposed to ***much higher risk*** of injury, illness or death. This does NOT mean surgeons are reckless or inept – it simply means that surgery is more dangerous than Physiotherapy.

Physiotherapy is the safer of the two treatment options, all other things being equal.

What does ‘all other things being equal’ mean? – It means that I am assuming that surgeons do not preferentially select more vulnerable patients on which to operate – which they don’t. In fact, in many cases the ***converse*** is true – Physiotherapists often undertake to treat patients for whom surgery is not an option because of their poor health status or the very low probability of surgical success.

Compare this to the incidence of neurological injury (e.g. TIA/stroke) after manual therapy to the neck [physiotherapy]– the ***least favourable*** estimate is ***one per hundred thousand*** - other rates are of the order of ***one per million to one per ten million*** manipulations.

That’s only a couple of studies... got any MORE evidence?

Yes

Street et al.

The Spine Journal, Volume 12, Issue 1, January **2012**, Pages 22–34
Morbidity and mortality of major adult spinal surgery. A prospective cohort analysis of 942 consecutive patients

Awarded the 2011 Outstanding Paper: Surgical Science

These authors, (Street et al. 2012) published a rigorously executed prospective analysis of ***all*** adverse events occurring in the entire population of patients presenting to an academic quaternary referral (surgery) centre¹². Their findings on the morbidity and mortality rates associated with spinal surgery provide ***some context***¹³ for comparison to adverse reaction rates for chiropractic.

¹² This is a high-quality teaching/academic surgery centre. These are ***high-end outcomes***

¹³ When it comes to risk (and many other important things) RELATIVITY (or ‘context’) is all important. There is **NO** point in telling a patient that ‘there is one chance in 600,000 that this anti-depressant will kill you, or even ***as happened here***, that there are ***7 chances in 100 that this surgery will kill you***, WITHOUT putting it in context by ***also*** telling them [for instance] that there is one chance in 550,000 of winning an Olympic Medal, which apparently in the US, is also the chance of being hit by lightning in a given year!’. Failing to provide the context is to FAIL to provide the information necessary for ‘informed’ consent. Without the context, there can be no informed consent.

They examined the outcomes of spinal surgery for **all** adult patients admitted to the spine service of a quaternary referral centre for a 12-month period. They measured morbidity ('sickness/illness') and in-hospital deaths, unplanned second surgeries¹⁴ during index admission, wound infections requiring reoperation, and readmissions during the same calendar year – and mortality (death). They also documented all intraoperative and nonsurgical postoperative adverse events, as well as hospital length of stay.

Here are some of their findings

Out of **942** patients who had spinal surgery at this unit during that time:

822 (**87%**) had at least one **documented** complication

Nearly 40% of **these** complications necessitated longer hospital in-patient stays

One tenth of ALL patients had intra-operative surgical complications

Just under **three-quarters of all patients** had post-operative complications

- wound complications, 13.5%
- delirium, 8%
- pneumonia, 7%
- neuropathic pain, 5%
- dysphagia, 4.5%

and

- neurological deterioration, 3%.

Yes, that really DOES say that **three out of EVERY 100** experienced neurological **deterioration**.

14 patients died – that is an almost **1.5 PERCENT surgery mortality rate**.

Let's cut to the chase here: If Chiropractors **killed 15 patients out of every thousand** that they treated, they would be arrested - and Chiropractic would be have been outlawed decades ago.

The **Canadian** authors concluded thus:

“Major spinal surgery in the adult is associated with a **high incidence of intra- and postoperative complications**. We identified a **very high rate of previously unrecognized postoperative complications**, which adversely affect LOS. Without strict adherence to a

¹⁴ A quaint euphemism

prospective data collection system, the true complexity of this surgery may be greatly underestimated.”

Over and over again, the research seems to STRONGLY support the assertion, that if you have a choice between chiropractic and spinal surgery – chiropractic is the SAFE option.

THE CALUMNY AGAINST CHIROPRACTORS ¹⁵

For instance, look at how we talk about Chiropractors. Do we *really* believe that Chiropractic is inherently dangerous? Why do we believe this? Are Chiropractors *really* as dangerous to patients as we like make out? Bluntly put: do Chiropractors *really* kill and injure as many patients as we glibly insinuate they do ... or do we just like to repeat and spread glib, unsubstantiated insinuations? Does Chiropractic expose [comparable] patients to more risk than say, prescription medications ... or facet joint injections? ... or spinal surgery?.... *Really?* Says who? Got evidence for that?

I do have evidence – from medical and surgical journals, and it says that medical and surgical treatments are more dangerous to patients than Chiropractic.

Is it possible that there are other factors at play here? Vested interests? Habit? Tribalism? Old School Tie? Some kind of mass hysteria? Even with a cursory ‘review’ like the one I’m doing here, it is clear that one should exercise caution – or at least intelligence – when approaching risk.

For example:

In one 2006 study that reported on 36 patients who had vertebral artery dissection “after” chiropractic manipulation of the neck, only *four* (yes 4!) of the 36 patients were actually manipulated by chiropractors, whereas *half* (18) of them were treated by *orthopaedic surgeons (YES, HALF!)*, five by a physiotherapist, and the rest by a neurologist, general medical practitioner, or homeopath. (Reuter et al., 2006). *It follows from the EVIDENCE in this study* that orthopaedists should warn patients that if they are having a neck manipulation, they should NOT allow an *orthopaedist* to do it. *THAT* is the obvious inference that can be made from this study.

Journal of Neurology, June 2006, Volume 253, Issue 6, pp 724-730

¹⁵ Let’s be clear here: I am NOT making a statement about the relative risks of being treated by a chiropractor and a physiotherapist (or even a doctor, a surgeon or a ‘lay practitioner’ for that matter) *BECAUSE* I have not done the reading and thinking required to lend weight to my opinion

But if you do a literature search of adverse reactions to ‘chiropractic manipulation’ this study will pop up despite the fact that **only 11% of the sample** were treated by Chiropractors at all! But they still ‘get the bad press’.

How Safe Are GP Visits?

A 2015 study published in the medical journal Spine compared the risk of injury to the head, neck, or trunk after an office visit for chiropractic spinal manipulation compared with office visit for evaluation by primary care physician, in older adults with a neuromusculoskeletal complaint. The results might SURPRIZE you.

They examined two cohorts of Medicare beneficiaries aged 66 to 99 years who attended a clinician with an office visit risk for a neuromusculoskeletal problem. The risk of injury to the head, neck, or trunk within 7 days¹⁶ of the clinic visit (meaning “after it”) was **76% lower among subjects with a chiropractic office visit than among those who saw a primary care physician**. Yes, that really DOES say “LOWER”.

It is of clinical interest to those who do HVLA procedures, that, in the CHIROPRACTIC group the risk of injury was higher in those who had a chronic coagulatory defect, inflammatory spondylopathy, osteoporosis, aortic aneurysm and dissection, or long-term use of anticoagulants. Your pre-HVLA history and pre-screening questionnaire should target these factors to minimize risk.

“found that the frequency of serious adverse events associated with chiropractic care varied from 0.05 to 1.46 per 10,000,000 manipulations, but that a lack of robust data compels the need for further investigation”

In randomized controlled trials, patients randomized to HVLA **were** more likely to report adverse reactions – and this has been demonstrated elsewhere. Let me restate that not all adverse events are strokes – most are headaches and increased pain. **No serious adverse reactions** were reported in the RCT’s of the Whedon (2015) review.

In the 6 prospective trials reviewed adverse effects were common (including increased pain), they occurred most commonly in the first 24 hours after manipulation, were transient, mild, and benign. **No serious adverse effects** were reported.

Though an Irish study cited earlier (Sweeny & Doody, 2010) found a **higher**

¹⁶ Note the use of the temporal convention ‘within 7 days’ in order to avoid attributing the patients’ injuries to the GP visit without sufficient evidence of causality.

reporting of serious adverse events after *low speed procedures* than after HVLA other studies have concluded that patients who have a stroke or other serious side-effect are more likely to have had a HVLA of some sort one week to **30 days beforehand**. Serious side effects are rare: In the Gouveia systematic review (2009) the estimated risk of the incidence of serious adverse events from published case reports and case series are about 1 case event per 1 to 2 million treatments. The risk of complications has been estimated to be between 1 in 40,000 manipulations for *mild complications* and 1 in 400,000 to over 1,000,000 manipulations for serious complications (again, not all serious complications are strokes).

“Dubito ergo cogito; cogito ergo sum.¹⁷”

Descartes

Life IS Risk

The very act of *living* exposes us to risk. This risk can be significantly modified merely by leaving our homes, eating certain foods, cycling a bike, going for a swim, hillwalking, smoking, drinking, having sex, exercising - or not exercising, for that matter. Do we warn patients about the risk of **TRAINING**? Consider for example, the ‘risk’ of having a job that requires you to sit for several hours per day, every day, for decades – like a GP or a dentist.

Many people even take risks to *enrich* their lives. They drive fast cars (indeed, they drive cars fast! – most egregiously of all, they TEXT or use phones while driving and thus thoughtlessly expose the rest of us to more risk); they fly microlite planes, go scuba diving, surfing, ice climbing, skiing; they do rock climbing, skydiving, mountain biking, ‘hot’ yoga, marathon running, judo and base jumping. Driving to work, flying, decorating your home - all these activities incur risk. So too do taking medications, entering a hospital, going to the dentist, having a medical procedure done for neck pain!

Professional Discourse

I *have* been given warnings (often unsupported, sometimes downright histrionic) about the risk of HVLA manipulation of the neck¹⁸. The warnings are seldom quantified in any way, and *rarely* expertly so. The level of stridency [rudeness, dismissiveness] with which such warnings are issued is usually *inversely* proportional to the amount of relevant skill, knowledge and scientific evidence at the speaker’s disposal. Indeed, these warnings are generally unaccompanied by **ANY** evidence at all [unless one counts anecdotal evidence, which I don’t – Anecdotal

¹⁷ I doubt, therefore I think; I think therefore I am

evidence can be summarized as: 'I once met this fellow and HE said ...']. The warnings are generally underpinned **solely** by the '*argumentum ad verecundiam*', that is, IF the speaker deemed it necessary to provide any underpinning at all.

Wouldn't you agree that 'that which is offered without evidence may be dismissed without evidence'?

"Doubt is the key to knowledge"
Iranian Proverb

How 'safe' are the alternatives to HVLA? What risks are associated with medications for example?

I mentioned opioids above, now for a quick look at some of the risks of NSAID's – a treatment for neck pain and headache, that might be administered in lieu of HVLA.

Serious complications of NSAID's include heart attack, stroke, cardiovascular death, gastrointestinal bleeding, perforation and obstruction. When a patient takes more than one NSAID or takes NSAID's with other medications there can be other complications related to the **interaction** of medications – these include seizures (epilepsy) increased risk of heart attack and stroke (Ann Rheum Dis. 2007 Jun;66(6):764-70. Epub 2007 Apr 5.) This study looked at 18,325 arthritis patients who were taking NSAID's.

A 2007 English meta-analysis (Pharmacoepidemiol Drug Saf. 2007 Jul;16(7):762-72) looked at data from almost 100,000 patients and found a **significantly increased risk** of heart attack in users of Coxibs compared to patients who took non-selective NSAID's.

A recent meta-analysis (scientific survey of the medical literature) carried out by Oxford investigators found that some NSAID's increased the risk of heart attack by 80% (myocardial infarction). BMJ. 2006 Jun 3;332(7553):1302-8.

Do selective cyclo-oxygenase-2 inhibitors and traditional non-steroidal anti-inflammatory drugs increase the risk of atherothrombosis? Meta-analysis of randomized trials.

Kearney PM, et al.

Clinical Trial Service Unit and Epidemiological Studies Unit, University of Oxford, Oxford OX3 7LF.

Current scientific research suggests there is risk associated with taking NSAID's and these risks vary from drug to drug. The risks are considered to be low (Presse Med. 2006 Sep;35(9 Spec No 1):1S11-23.

What do we know about the cardiovascular toxicity of the NSAIDs?

Sibilia J, Deray G, Montalescot G.

Service de Rhumatologie, CHU de Strasbourg, Hôpital de Hautepierre, Strasbourg 67000)

A US study examining data from over 600,000 patients found that risk of hospitalization for acute myocardial infarction (heart attack) stroke, and death from coronary heart disease (CHD) was **significantly increased** in users of NSAID's compared to non-users. Patients within this cohort with a past history of cardiovascular disease had a greater risk of acute heart attack, stroke and death from coronary heart disease (CHD) than those with no past history of CVD.

In a 2008 study (Stroke. Jul;39(7):2037-45. Epub 2008 Apr 24.

Non-aspirin NSAIDs, cyclooxygenase 2 inhibitors, and the risk for stroke.

Roumie CL, Mitchel EF Jr, Kaltenbach L, Arbogast PG, Gideon P, Griffin MR.

Veterans Administration, Tennessee Valley Healthcare System, Tennessee Valley Geriatric Research Education Clinical Center, Nashville, TN 37212, USA.) the same research team looked at a cohort of 336,906 patients taking Coxibs and NSAID's. These patients had 4354 hospitalizations because of stroke and Coxib users had **significantly greater risk of stroke** than NSAID users.

Some thoughts about events and consequences

<http://www.edwardtufte.com/tufte/hill>

I see event “B” happening after event “A” – so I infer that “A” must have caused “B”

Right?

Wrong!

When it comes to *accurately* attributing ‘causes’ to ‘consequences’, we humans are not nearly as good as we think we are. It takes very careful observation and systematic, rational thinking to do this well, and we *often* fail.

One of the most frequent ‘thinking errors’ we make is called the ‘*post hoc ergo propter hoc error*’ – this means we conclude that because one event happens *after* another that the first event *caused* the second. Superstitious thinking is *one* example of this. This is a very popular form of irrational thinking. It is responsible for many superstitions like the one that claims that one will suffer ‘7 years bad luck’ because one broke a mirror, or the one that predicts ‘bad luck’ (or is it ‘good luck?’) to sightings of a black cat. We like to think we have outgrown this child-like way of thinking – but we haven’t.

“A political party takes power in an election and then the economy improves – THEY must have brought about the improvement.” Sorry, but no.

“I got a rash *after* taking *Soma* – it MUST have caused the rash (or headache, or tummy trouble, or ‘tingling’). Not necessarily.

“An epidemic killed half the children in the village the year of the comet. The comet was a Harbinger of Doom”. Superstitious Thinking.

“My child did badly in the Leaving Cert... he had a difficult birth – it MUST have been the difficult birth.”

“My hip has been sore since I ‘twisted awkwardly’ getting into the car – yes, the hip pain came on several months AFTER getting into the car, it MUST have been that ‘twist’ that did it...” Not necessarily.

For many people, *post hoc ergo propter hoc* is the *default mode* of thinking. One could almost say it is our ‘natural’ way of attaching “causes” to observed “effects”. And we often get it wrong.

Clearly, because one event happens *after* another, it **does NOT follow** that the first **CAUSED** the second. Those who assume this are indulging in superstitious thinking, and have fallen victim to the '*post hoc ergo propter hoc*' error. There IS a chance that they are 'right' of course.

The same can be said of adverse effects of treatment. For instance, if a patient develops a rash (ache, headache, tummy ache, 'cramp', tingling, blurred vision or what have you) at some time *after* ingesting a medication, one can not AUTOMATICALLY conclude that the medication **caused** the "rash".

This applies to events that might occur *after* physiotherapy treatments. One must COMPARE the number of people who have had an adverse reaction after Physiotherapy treatment, to the proportion of people who had the same adverse reaction after treatments or procedures (e.g. surgery/injection) **INSTEAD** of Physiotherapy.

Compared to drugs, injections and surgery, Physiotherapy (including 'manual therapy', dry needling, exercise therapy and traction) is often the safest treatment option available to patients.

Secondly, one must **compare** the number of people who have had adverse reactions after Physiotherapy treatments such as dry needling, manual therapy, exercises or traction, **to** the number of people in the GENERAL POPULATION who experience the SAME unpleasant symptoms **without any treatment at all**. These "side-effects" (ironically, to NO treatment) might include pain, reduction in range of motion or function, bruising, rashes, injuries, fractures, injuries to blood vessels or even problems like strokes or TIA's.

It is essential (but not sufficient) to do this, if one is to establish whether a given treatment has **caused** an observed 'side-effect', or whether the observed 'side-effect' has merely happened *after* the treatment and there is no causal link between the two.

The scientific research shows that serious side-effects rarely **follow** physiotherapy treatments – and are even more rarely **caused** by them.

It is humbling to do this, but we must apply the **same** analysis to positive events that occur after a treatment. If a patient presents for follow up after, for instance, a manual therapy treatment, we **cannot** be absolutely sure that our treatment was **solely** responsible for **all of** the observed improvement in their condition. How many times have patients demanded anti-biotics from their GP for a bout of common cold or 'flu, recovered and erroneously attributed their recovery to the anti-biotics?

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Some probabilities and relative risks for context

RISKS must be considered in the context of OTHER risks

Chance of dying from any kind of injury during the *next year*: 1 in 1,820

Chance of dying from a car accident: 1 in **18,585**

Chance of dying in an airplane accident: 1 in **354,319**

Chance that Earth will experience a catastrophic collision with an asteroid in the next 100 years: 1 in 5,000

Chance of having a stroke: **1 in 6**

Chance of dying from heart disease: 1 in 3

Odds of getting a hole in one: **1 in 5,000 – 10,000** depending on who you believe

Odds of winning an Olympic medal: 662,000 to 1

Odds of drowning in a bathtub: **685,000 to 1**

Odds of fatally slipping in bath or shower: **2,232 to 1**

Odds of being struck by lightning in any given year: **576,000 to 1**

Odds of being killed by lightning in any given year: **2,320,000 to 1**

Odds of being murdered: **18,000 to 1**

Chance of dying from contact with a venomous animal or plant: **1 in 3,441,325**

Chance of dying from being bitten by a dog: **1 in 700,000**

Chance of an American woman developing cancer in her lifetime: **1 in 3**

Chance of getting prostate cancer: **1 in 6**

Chance of getting breast cancer: **1 in 9**

Odds of dying in a natural disaster: **3 in 10,000**

Time Magazine Article Saturday, January 29, 2011

Researchers from New York City's Memorial Sloan-Kettering Cancer Center and Seattle's Fred Hutchinson Cancer Research Center devised a mathematical model that predicts the likelihood that lung cancer will be diagnosed in a smoker within 10 years. You can find the model on the Web at www.mskcc.org

Consider the case of a 51-year-old woman who smoked a pack a day from age 14 until she stopped at age 42. The model puts her chances of getting lung cancer in the next decade at less than 1 in 100. Compare that with a 68-year-old man who has smoked two packs a day for 50 years and hasn't quit. He has a 1-in-7 chance of getting lung cancer by his 78th birthday. If he quits, his 10-year risk drops to 1 in 9. So what's a smoker to think? A 1-in-7 chance of getting lung cancer will scare some folks into quitting, but you might be tempted to shrug off a 1-in-100 chance and think to yourself, As long as I quit by 42, I'm O.K. Think again. More smokers die of heart disease than lung cancer--not to mention that smokers have greater susceptibility to emphysema and other chronic illnesses.

Read more:

<http://www.time.com/time/magazine/article/0,9171,1004582,00.html#ixzz1CRr3qLW8>

From Cancer.org

<http://www.cancer.org/Cancer/CancerBasics/lifetime-probability-of-developing-or-dying-from-cancer>

Chance that a man will get bladder cancer some time during his lifetime: 1 in 26

An article on CBS interactive business network in April, 2002, by Dr. Mike Borowsky, department head and Dr. John Gaynor, mathematical statistician in the Statistics and Mathematics Department, Naval Safety Center – about relative risk.

“Four hundred and fifty people died in 12 fatal U.S air-transport accidents from 1996 to 2000. Meanwhile, **209,117** people, including 30,189 pedestrians and bicyclists, died in 186,474 fatal traffic crashes. In 2000 alone, 37,409 crashes killed **41,821** people.

That's 114 people, per day, who died on the highways--***the equivalent of a large commercial aircraft crash every other day!***

In the same five-year period, there were 50,141,570 aircraft departures. These flights totaled 31,535,345,000 miles and 77,682,791 flight hours. So your chances of being on a flight that crashes and kills people would be **1 in 4,178,464. You could fly one flight per day for more than 11,000 years without incident.**

Let's say you're taking a vacation 600 miles from home. If you fly, your chance of being in a fatal crash is 1 in 2,089,232 (Don't forget, it's a round trip, so there are two flights, if they both are direct). Your chances of being in a fatal aircraft accident during your trip is extremely small--about the same as winning the Virginia lottery in seven plays.

Because you're afraid to fly, you decide to drive that 1,200-mile round trip. Based on the 25,492 driver fatalities and the 2.7 trillion vehicle miles traveled per year, the likelihood you will die on the trip is 1 in 88,263. ***If you drive, your chances of dying in a crash during your trip are about 24 times higher than if you go by airplane.*** In 20 years of driving in a motor vehicle, at 20,000 miles a year, you have a 1-in-265 chance of dying.

If, on second thoughts, you decide to fly on your trip, should you fly via commercial airline or in a Navy or Marine air transport? From 1996 to 2000, U.S. air transport accidents killed 447 aircraft occupants. The fatal-accident rates were 0.024 fatal accidents per 100,000 departures and 0.015 per 100,000 flight hours. However, there were no fatal C-9 or C-130 mishaps during fiscal years 1981 to 2002 (through 14 November), in which there were 781,442 aircraft departures that flew 2,003,030 hours.”

We are all familiar with the irritating ploy used by the ‘low-brow’ press to generate sales: “New heart drug doubles the chances of getting cancer!!!!” This kind of rubbish must drive physicians insane. These headlines never supply pertinent information such as the increase in probability of dying from cardiac causes if the ‘new’ drug is **not** taken, or the fact that the patient’s chances of getting this particular kind of cancer while on this drug have doubled from 1:2,000,000 to 1:1,000,000 and the chances of them dying from sudden MI while **not** on the drug are 1:25,000. Few tabloids would mention that the cancer in question is easily treated if the patients are monitored and it is caught early. We are familiar with this dishonest ploy and yet how many of us do something very similar?

Miscellaneous Sources of Additional Information

Recorded DEATHS from prescription medications from the American Center for Disease Control

<http://www.cdc.gov/drugoverdose/data/overdose.html>

Article from Psychology Today:

<https://www.psychologytoday.com/blog/wicked-deeds/201404/prescription-drugs-are-more-deadly-street-drugs>

<http://www.cchrint.org/2014/11/12/deaths-from-prescription-drugs-skyrocket-top-3-overdose-drugs-include-adhd-drugs-anti-anxiety-drugs/>

Legal medications cause three quarters of poisoning deaths

<http://www.irishexaminer.com/ireland/legal-drugs-cause-75-of-poisoning-deaths-302685.html>

National Medication Related Deaths Report – Ireland

http://www.hrb.ie/uploads/tx_hrbpublications/NDRDI_web_update_2004-2012_15-12-2014.pdf

It's getting worse – if you are concerned about treatment risks, the research shows that the Physiotherapist's clinic is not the place to look:

<http://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates>

Three quarters of a million people die in the US every year from 'conventional medicine mistakes' – the US is about one twentieth of the world's population.

"Out of the 783,936 annual deaths from conventional medicine mistakes, approximately 106,000 of those are the result of prescription drug use [1]."

<http://www.collective-evolution.com/2013/05/07/death-by-prescription-drugs-is-a-growing-problem/>

1. Null, G PHD. (2011). *Death by Medicine*. Mount Jackson, VA: Praktikos Books.

"Each day, 44 people in the United States die from overdose of prescription painkillers."

<http://www.cdc.gov/drugoverdose/epidemic/index.html>

If Chiropractic (or physiotherapy) was responsible for the death of 44 people per day (or even 5) – it would be outlawed. There is a lot more money in pharmaceuticals – they hire heavy-duty, high-end lobbyists.

The Physiotherapy clinic is not the place to look for 'danger'

<http://www.nytimes.com/2016/01/10/opinion/sunday/a-placebo-treatment-for-pain.html? r=0>