

## Research of a holiday kind

## One giant leap for mankind? A cost-utility analysis of abolishing the law of gravity

## ABSTRACT

**Background:** Canada's Neo Rhino Party, a joke political party created in 2006 as a successor to the Parti Rhinocéros, is planning a new regulation to repeal the law of gravity, which could have an important impact on diseases attributable to gravity on earth.

**Methods:** We sought to estimate the number of quality-adjusted life-years that would be saved if the proposed regulation is passed and determine the cost-effectiveness of adapting Boris Volfson's antigravity machine<sup>1</sup> for use on earth. We performed an economic analysis using a hidden Markov model.

**Results:** Our results suggest that a microgravity environment would save over 2 million quality-adjusted life-years. The cost for every quality-adjusted life-year saved is estimated to be \$328.

**Interpretation:** Microgravity is the solution to the health care crisis in Canada. In addition, using technological, statistical and medical jargon gives us the opportunity to defy the laws of physics, mathematics and medicine.

Canada's Neo Rhino Party is a joke federal political party that was created in Montréal, Quebec, in 2006 as the successor to the Parti Rhinocéros. Commonly called the Rhinoceros Party in English, this party was a registered political party in Canada from the 1960s to the 1990s. It was founded in 1963 by Jacques Ferron, a Canadian physician and author. The party's basic credo was "a promise to keep none of our promises." Its election platforms comprised impossible schemes that were designed to amuse and entertain the voting public. Some Rhinoceros Party promises included reducing the speed of light because it's much too fast, paving Manitoba to create the world's largest parking lot, providing higher education by building taller schools and repealing the law of gravity. When this last promise was made in the 1980s, it was unthinkable, that is, until Boris Volfson of Huntington, Indiana, received US Patent 6 960 975 for his design of an antigravity machine.<sup>1</sup> The Neo Rhino Party is currently planning a new regulation to repeal the law of gravity that could have an important impact on diseases and other health outcomes attributable to gravity on earth.

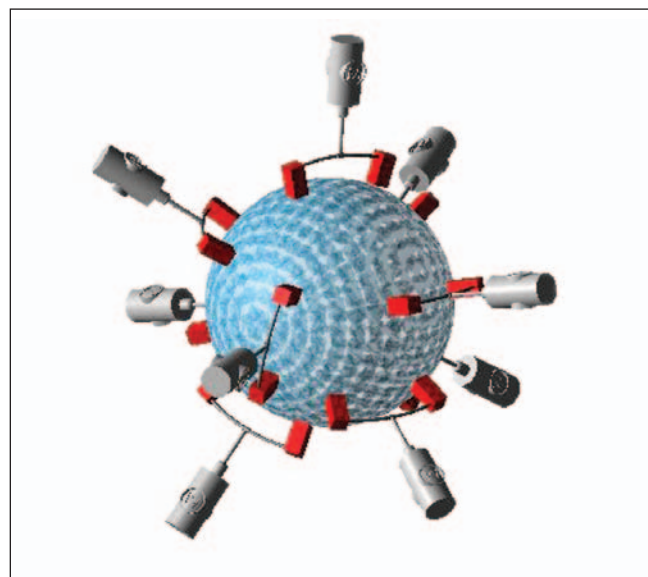
## Methods

We sought to estimate the number of quality-adjusted life-years that would be saved if the Neo Rhino Party succeeds

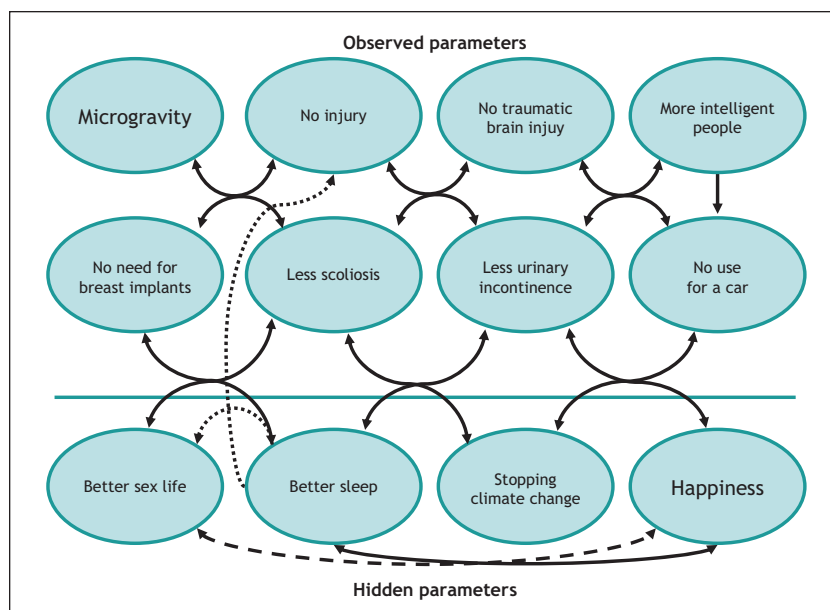
in repealing the law of gravity. We also sought to analyze the cost-effectiveness of adapting Volfson's antigravity device for use on earth as a means to diminish the burden of disease attributable to gravity. Volfson's invention is a method for generating a pressure anomaly of an inflationary vacuum state using the following steps (some occurring simultaneously): providing a space vehicle comprising a hollow superconductive shield, an inner shield, a support structure, upper and lower means for generating an electromagnetic field, electric motors, a power source, life-support equipment, a flux modulation controller and a crew; generating electrical energy in the power source; and converting this electrical energy into an electromagnetic field, thus creating an area of relatively lower vacuum pressure density (Figure 1).

## The model

A Markov model is a useful way to prove cost-effectiveness. This model is infinitely flexible and offers many opportunities to test assumptions, which enables us to generate data and pick those that support our case most effectively. We opted to use a hidden Markov model — a statistical model in which the system is assumed to be a Markov process with unknown parameters — to perform our cost-utility analysis. The challenge was to determine the hidden parameters from the observable parameters. In a regular Markov model, the state is directly visible to the observer, therefore the state transition



**Figure 1:** Illustration of Boris Volfson's antigravity device (reproduced with permission).<sup>1</sup>



**Figure 2:** The Hidden Markov Model.

probabilities are the only parameters. In a hidden Markov model the state is not directly visible, but variables influenced by the state are visible (Figure 2).

### The analysis

We fit cost and health benefit factors within our model. Table 1 lists the factors included in our cost-utility analysis. We investigated the problems in abolishing gravitational force, namely the generation of endless energy to create the space-time curvature modification needed for Volfson's anti-gravity machine. We think that the nuclear power of the US and Russian Federation armies and the "civil" nuclear programs of North Korea and the Islamic Republic of Iran would be sufficient to generate the required energy supply. Table 2 lists the number of quality-adjusted life-years saved as a result of microgravity for diseases and other health outcomes. In order to limit negative physiologic effects owing to a microgravity environment, we will be required either to perform complicated threshold analyses or simply build the anti-gravity device with an intensity regulator to permit the presence of gravity between 3 am and 7 am each day. We also assumed that, in a microgravity environment, cars would not be useful and that transportation would be necessary only for overseas travel. As a result, the use of fossil fuels would decrease by 90%, solving the problem of greenhouse gas emissions and stopping climate change. This, in turn, would lead to fewer hurricanes and floods, resulting in fewer injuries, deaths and other health-related outcomes.

### Results

The cost of adapting the anti-gravity device to potentially save 2 025 036 quality-adjusted life-years would be \$Can666 million, resulting in a cost of \$Can328 per quality-adjusted life-year saved (Table 1). Mechanical testing using anthropo-

morphic test dummies, animals, cadavers and live human (astronauts) test subjects in microgravity resulted in about 1 million quality-adjusted life-years saved.

Creating a microgravity environment each day between the hours of 7 am and 3 am the next day would save 2 025 036 quality-adjusted life-years according (only) to our estimate (Table 2). Microgravity would resolve the obesity crisis and the health care costs associated with obesity. For example, considering that weight equals mass times gravitational acceleration ( $w = m \times G_a$ ), a man weighing 100 kg and measuring 175 cm in height would see his body mass index reduced from 32.7 kg/m<sup>2</sup> to 16.3 kg/m<sup>2</sup> in a microgravity environment (0.5 G).

### Interpretation

Our study demonstrates that microgravity is the solution to the health care crisis in Canada.

To virtually guarantee that our intervention presents an incremental cost-effectiveness ratio, we followed 3 simple rules, which conveniently allowed us to add and subtract facts to make our case stronger:<sup>2</sup>

- when there is little empirical research evidence of good quality, generate your own estimates;
- use as much technical jargon as possible; and
- do not worry readers with the intricacies of our model and just report the bottom line.

This study presents tons of limitations. A large volume of data exists to document the multiple detrimental physiologic effects of microgravity exposure on human physiology.<sup>3-6</sup> Organ systems, including the cardiovascular, neurohumoral, immune, hematopoietic and musculoskeletal systems, may be particularly affected. However, our research suggests that these physiologic effects can be mitigated by building the

**Table 1:** Cost of adapting Boris Volfson's anti-gravity device<sup>1</sup> for use on earth

Element of the anti-gravity device	Can\$, millions
Power source*	300
Upper means for generating an electromagnetic field*	200
Hollow superconductive shield (inner shield)	100
Upper rotating element	40
Support structure	20
Flux modulation controller	3
Intensity regulator†	3
Total	666

\*Energy derived from nuclear weapons with cooperation from the US and Russian Federation armies and from the "civil" nuclear programs of North Korea and the Islamic Republic of Iran.

†Intensity regulator allowing the presence of gravity between 3 am and 7 am each day is needed to offset negative physiologic effects due to microgravity exposure.

**Table 2:** Number of quality-adjusted life-years saved as a result of microgravity, by event or condition

Event or condition	No. of quality-adjusted life-years saved*
Car crashes	1 000 000
Obesity	1 000 000
Bicycle injuries	10 000
Falls (seniors)	10 000
Hurricanes, floods and other events related to climate change	5000
Defenestration	15
Arthrosis	5
Orthostatic hypotension and syncope	5
Pressure ulcers	4
Erectile dysfunction	1
Gastroesophageal reflux while sleeping	1
Glaucoma	1
Lombalgia	1
Parachute accidents	1
Scoliosis	1
Varicose veins	1
<b>Total</b>	<b>2 025 036</b>

\*Ballpark figure.

antigravity device with an intensity regulator to permit the presence of gravity between 3 am and 7 am each day.

In addition, we only looked at the positive side of microgravity. We did not consider the medical problems (e.g. increased constipation and gastroesophageal reflux) or technical problems (e.g., wigs, intravenous fluids and toilets) related to the absence of gravity.

Furthermore, although we expect that, with a resolution from the United Nations, the United States, Russia, North

Korea and the Islamic Republic of Iran would promptly, and with a great sense of altruism, work together for the well-being of humankind by providing the nuclear power to generate the energy supply required for the antigravity device, the cooperation of these countries is only hypothetical.

Finally, in our model, we tried to take into account the probability of human–airplane crashes that would result from “giant leaps” owing to microgravity. We considered that human–airplane collision probability depends on the relative position-error covariance matrix in the encounter region, and that the probability of a jumping human hitting an aircraft depends on the combined position-error covariance and head-positioning-error covariance. The potential number of human–airplane crashes could limit the benefit of a microgravity intervention; however, a new law to regulate minimal flight altitude would diminish the impact of this inconvenience.

In conclusion, we proved that technological, statistical and medical jargon can convince intelligent people to read a manuscript. The proof? You’re reading it!

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