

# Burn SPOTLIGHT: ABA Research Committee Newsletter



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## Literature Review: Autologous fat transfer to improve the appearance of burn scars

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Autologous fat transfer is a well described technique used by plastic surgeons for soft tissue augmentation, but has only recently been studied to improve the appearance of burn scars. Several recent published studies have shed light on the positive effects of fat grafting to improve the appearance of burn scars and its potential mechanism of action (1). In one of the largest prospective study performed to date, Klinger et al. (2) described 694 patients who had retractile and painful scars, of which about half were secondary to burns. Patients underwent fat grafting via the Coleman technique and were followed for 12 months after surgery. A subset of 20 patients had their scars assessed using the Patient and Observer Scar Assessment Scale and durometer assessment at 3 and 6 months after surgery. The scars showed statistically significant improvement from an aesthetic and functional standpoint when reviewed by both the patients and physicians. The study however lacked a control group to demonstrate the natural history of scar maturation.

The conclusions of this study were corroborated by Bruno (3) in a prospective, controlled study evaluating 93 burn scars. Half of a scar was treated with fat and the other half served as a control. Eight millimeter punch biopsy specimens were taken of the treatment side and the control side of the scar before treatment, and at 3 and 6 months after fat grafting. The fat grafted areas of the scars were noted to have a higher number of organized collagen fibers, elastin, increase vascularization in the papillary dermis, and a decrease number of Langerhans cells. This correlated with improvements in the scar as noted by the Vancouver scar scale completed both the subjects and their physicians. The authors noted that the results are best seen after 6 months and concluded that autologous fat transfer be used to improve the results of standard surgical procedures. The results of this study, while encouraging, do not account for the dose of fat injected or the proliferative activities of the fat cells. More controlled studies continue to be underway.

Several authors have postulated as to how fat improves scar appearance and function. It has been shown that fat grafting alters the wound healing process by stimulating angiogenesis, release of cytokines and growth factors and by reducing inflammation and fibrosis. Subcutaneous adipose tissue contains multipotent mesenchymal adipose tissue-derived stem cells (ASCs.) Animal studies have shown that a large percentage of ASCs survive after fat grafting. Although not definitively proven to be the cause of the regenerative effects of fat grafting, ASCs most likely account for these changes. Whether ASCs act directly or through paracrine factors that function to increase tissue repair is still very much unclear.

Burn scars represent the most significant source long term morbidity following burn injury and autologous fat transfer represents another tool in the surgeon's armamentarium to improve its form and function. While a few controlled studies have been performed, more rigorous and multi-centered studies are underway to determine its true efficacy and actions.

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## References

1. Rinker BD, Vyas KS. Do stem cells have an effect when we fat graft? Fat versus fiction. *Ann Plast Surg.* 2015;00,1-5.
2. Klinger M, Caviggioli F, Klinger FM, et al. Autologous fat graft in scar treatment. *J Craniofac Surg.* 2013; 24; 1610-1615.
3. Bruno A, Delli Santi G, Fasciani L, et al. Burn scar lipofilling: immunohistochemical and clinical outcomes. *J Craniofac Surg.* 2013; 24;1806-1814.

## An Interview with Stefania Spano, Moyer Award Winner 2015

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*Tell us about your background. Where did you grow up, and attend college?*

I grew up in Thornhill, Ontario, Canada. I received my Honours Bachelor of Science Degree from the University of Toronto in 2010, where I studied Neuroscience and English literature. Following this, I continued studying at the University of Toronto and received a Master of Science degree in Biomedical Communications in 2012. That same year, I began medical school at Queen's University in Kingston, Ontario.

*Where are you in your education and training now?*

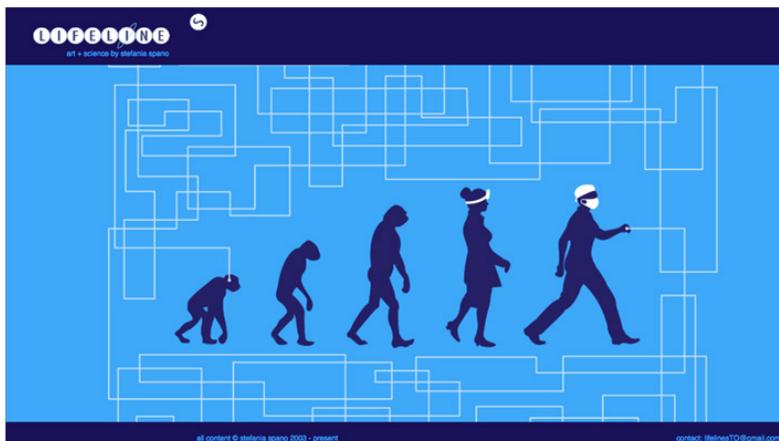
I am now in my fourth and final year of medical school at Queen's University, and have just applied for residency.

*What do you enjoy spending your free time doing?*

In my free time, I enjoy running, drawing, creative writing, and going to the theatre. I am also the proud owner of an exponentially growing book collection that I will never, ever finish reading.

*Can you tell us about your website LifeLines?  
([uoft.me/stefania](http://uoft.me/stefania))*

In addition to medical school and clinical research, I am a freelance biomedical communications specialist. LifeLines is an online portfolio of my biomedical projects and artwork.



*How did you become interested in burn care?*

I originally became interested in burns from a global health perspective. As you know, burn injuries are a leading cause of morbidity and DALYs lost worldwide (especially in middle- and low-income countries); they result in over a quarter of a million global fatalities annually; they consume millions of healthcare dollars annually; and, at the individual level, they have a significant biopsychosocial impact on survivors who are disfigured and/or disabled as a result of their burn injuries. These facts are staggering when one considers the preventable nature of burns.

Historically, burn care has a proud Canadian heritage. I am currently reading "The Reconstruction of Warriors" by E. R. Mayhew, which explores the groundbreaking work by Archibald McIndoe, Ross Tilley and the Guinea Pig Club (the group of Allied aircrew treated for burns at England's Queen Victoria Hospital during World War II). Many of the Guinea Pigs were RCAF pilots; Tilley would go on to teach plastic surgery at Toronto and to found plastic surgery education at Queen's University (both my alma maters). Such a medical and civic legacy is quite inspiring.

From an academic perspective, burns are such interesting traumas. Burn research is a complex intersection of multisystem physiology, critical care medicine, and surgery. Thus, I reached out to Dr. Robert Cartotto (Ross Tilley Burn Centre, Toronto, Canada) in my second year of medical school, in the hopes of doing clinical research in a fascinating area of medicine. He graciously accepted.

## “An Interview with Stefania Spano, Moyer Award Winner 2015” (cont.)

Where did the idea for the study “Does Bronchoscopic Evaluation of Inhalation Injury Severity Predict Outcome” originate?

This project is part of ongoing work by my supervisor, Dr. Robert Cartotto, at the Ross Tilley Burn Centre in Toronto.

Inhalation injury is an important determinant of mortality in burn patients. Currently, the gold standard for diagnosing inhalation injury is by bronchoscopy. In 2007, Endorf and Gamelli introduced the Abbreviated Injury Score (AIS) for bronchoscopic grading of inhalation injuries. To date, three pivotal studies have assessed the relationship between AIS grade and outcomes such as fluid resuscitation, oxygenation, duration of ventilation, and mortality. However, results have been mixed and the prognostic capacity of AIS grades remains unclear.

In light of these contrasting findings, the purpose of our study was to assess the relationship between AIS inhalation injury severity grade and clinical outcomes in burn patients.

How did you go about designing your study and tackling the data?

We performed an IRB-approved retrospective review of respiratory therapy records at Sunnybrook Hospital to identify all mechanically ventilated burn patients between January 1<sup>st</sup>, 2007 and June 1<sup>st</sup>, 2014. We did two comparisons of clinical outcomes. First, we compared patients according to AIS Grade severity (AIS grade 1 versus 2 versus 3 versus 4). Second, as proposed by the work of Albright *et al* in 2012, we clustered and compared patients by low-grade injury (AIS grades 1 and 2) versus high-grade injury (AIS grades 3 and 4).

Is there any follow up planned for this study?

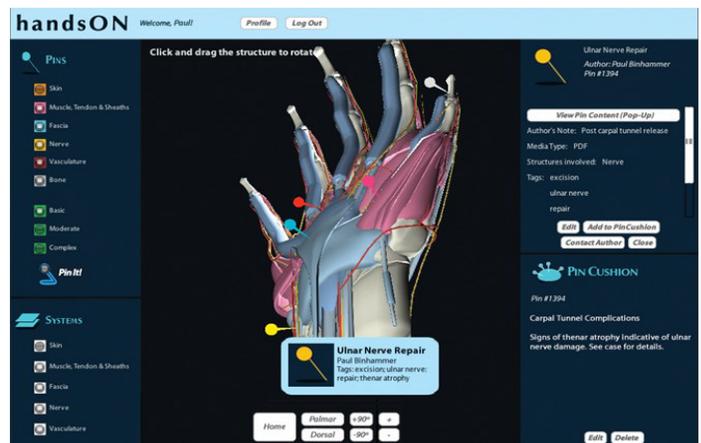
We received excellent feedback at the American Burn Association meeting earlier this year, as well as from the reviewers at the Journal of Burn Care & Research. As a next step, we are now analyzing the ventilator parameters for the subset of subjects that went on to develop ARDS. The abstract for this new data has been accepted for the 2016 meeting of the American Burn Association.

What's next for you?

I am currently awaiting the results of my residency applications. I look forward to graduating from Queen's School of Medicine in the spring of 2016, and hopefully continuing my research with the exceptional Ross Tilley Burn Centre team.

### A note on “biomedical communications”:

The field of biomedical communications creates biomedical education tools by marrying art with technology (computer animation and illustration, websites, apps, 3D printing, virtual reality, and so on). These tools could be anything from a traditional anatomical illustration for a textbook; to an app that teaches surgeons about common hand injuries; to a public health website about peripartum sexual health; to an online graphic novella about the PTSD experience. In its infancy, biomedical communications was simply traditional medical art and illustration; since the advent of computers and related technology, the field has flourished far beyond traditional illustration, hence the more inclusive and accurate (though less self-explanatory) title of “biomedical communications”.



## Survey-Based Research and the Iterative Process

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Clinical research is not often described as an iterative process. Yet, when the scientific method is considered in its totality, we can see that research is indeed a cyclic, ongoing process.

The iterative process is vital in the area of survey-based research because the central component in these studies is the survey instrument. It is in the development of the survey where this iterative process is of utmost importance. The instrument must be carefully crafted and ideally it should be tested for validity and reliability. In the last issue of this newsletter we introduced the Survey Advisory Panel (SAP). The panel was created to assist members of the ABA community with the development of their survey instruments. Under the direction of the ABA Research Committee Chair (Dr. Jeffrey Shupp) and the SAP Subcommittee Chair (Dr. Melissa Pressman), the members of the SAP review the survey questions and provide feedback for ongoing instrument development. In addition to the survey questions, investigators should provide a cover letter with delineation of the research question/hypothesis, the study objectives, and the target sample population. This information provides a framework for analyzing the questions in the survey. There are several important factors we consider in our critique. Among these are:

**Clarity-** Is the question clear in its intent and purpose and is it true to the study objectives?

**Conciseness-** Is the question too wordy and/or complicated?

**Memory or recall-** Does the question rely on recall of data or estimates that may not be readily available?

**Open-ended questions-** Could the question generate answers that are too numerous, variable, and lengthy facilitate analysis and reporting?

**Question order/context-** Do the questions flow naturally and provide proper context to assist the respondent's thought processes?

**Length of the survey-** Does the number of questions balance the need to obtain sufficient data to test the hypothesis with the consideration that long surveys may discourage participation and affect sample size.

When the survey-based research design is considered as a whole, the following are important questions that are considered. Therefore, these should be addressed during project development, data acquisition and analysis, and final reporting:

Who was the target population?

What were the sampling procedures Why were they used?

Why was the particular sample chosen?

How does the type of survey match the research questions or hypothesis?

Did the researchers use a questionnaire or interview survey? Why was that particular instrument selected?

How was reliability and validity of the instrument established?

How was the instrument administered? (Dates, procedures for collection, follow-up procedures)

Is a sample of the instrument provided so that readers can evaluate the construction of the questions?

To what extent are the conclusions related to their research questions? Are the conclusions appropriate to the results?

To what extent are the implications and generalizations appropriate, or not?

Are limitations acknowledged? Are there other limitations that are not mentioned?

Survey-based research is and will continue to be an important contributor to the advancement of burn care. Done properly, results from these studies yield information that provides the foundation to design follow-up projects, whether they be retrospective or prospective, single or multi-center. Improper design, however, may yield sampling error, bias, and inappropriate conclusions. The SAP is here to help make successful your survey-based research endeavors.

\,i-tē-'rā-shən\

the action or a process of iterating or repeating: as a procedure in which repetition of a sequence of operations yields results successively closer to a desired result\*

\*from [www.merriam-webster.com](http://www.merriam-webster.com)



To date, the SAP has provided review and constructive feedback on approximately 20 surveys. The majority of these surveys have been distributed to ABA membership through the central office and will be presented in either manuscript or abstract form.

For more information or submit your survey for review, please contact:

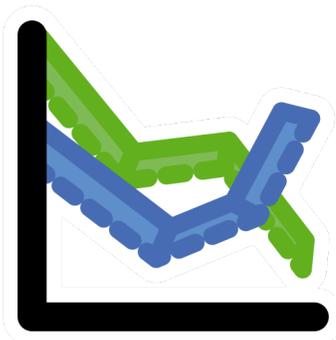
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## Making Sense of Biostatistics: Incidence vs Prevalence

Melissa Pressman, PhD

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Incidence and prevalence both describe the distribution of a disease within a population. Although their meanings are similar, the terms cannot be used interchangeably.

### Incidence

Incidence is the number of new cases of a certain disease within a population within a defined period of time, divided by the number of persons at risk. It is typically used to measure the rate of newly diagnosed disease.

### Prevalence

When assessing the impact of a problem within a population of individuals to determine their actual health care needs, we need more than just the rate of new disease occurrence. This is where prevalence comes in; prevalence is the total number of cases of a disease in a defined population during a specific period of time, divided by the number of persons at risk. This term takes into account both new and old cases.

### Example

For example, let us consider tuberculosis, a disease with a long recovery period. Imagine that, in 2010, there was an epidemic of the disease on a small island in the Pacific Ocean; however, by 2011, the epidemic was under control and tuberculosis was no longer being contracted. The island's population had a large incidence during 2010 (there was a large number of new cases) and a low incidence in 2011 (there were very few new cases). In 2011, the disease incidence (number of new cases) was thus low, but the prevalence (total number of cases — new and old) remains high because tuberculosis takes time to cure, and some of the population is still undergoing treatment.

### A Quick Recap

- Incidence refers to the number of new cases of a disease in a defined period of time, divided by the number of persons at risk. Incidence is used to describe the rate at which a disease is spreading within a population. Incidence can thus be used to determine the risk of a disease to a population.

- Prevalence refers to the total (old and new) number of cases in a defined period of time, divided by the number of persons at risk. Prevalence is used to describe how widespread a disease is within a population.

- If you are recruiting subjects for a study of an acute disease like influenza, incidence is the important statistic. On the other hand, if you are recruiting for a study of a chronic disease like hypertension, prevalence is the important statistic.

**Originally published at:** [http://firstclinical.com/journal/2012/1205\\_Biostatistics41.pdf](http://firstclinical.com/journal/2012/1205_Biostatistics41.pdf)

### References

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2. Hulley SB, Cummings, SR; Browner WS; Grady DG; Newman TB. Designing Clinical Research. Philadelphia: Lippincott Williams & Wilkins, 2007. Pages 110-112.

## Current Funding Opportunities

Compiled by Robert Cartotto, MD FRCS (C)  
Ross Tilley Burn Centre at Sunnybrook Health Sciences Centre, Toronto, ON Canada

	January-February 2016	Posting Date	Closing Date for Applications	Program Funding	hyperlink
1	HHS Department of Health and Human Services Agency for Health Care Research and Quality AHRQ Mentored Clinical Scientist Research Career Development Award (K08)	Jan 12 2016	March 12 2016	not specified	<a href="http://www.grants.gov/web/grants/view-opportunity.html?oppld=210633">http://www.grants.gov/web/grants/view-opportunity.html?oppld=210633</a>
2	HHS Department of Health and Human Services National Institutes of Health Use of 3D Printing for Creation of Implantable Devices (R21/R33) Grant	Jan 13 2016	March 17 2016	1.75 million	<a href="http://www.grants.gov/web/grants/view-opportunity.html?oppld=280955">http://www.grants.gov/web/grants/view-opportunity.html?oppld=280955</a>
3	HHS Department of Health and Human Services National Institutes of Health Investigator Initiated Multi-Site Clinical Trials (Collaborative R01) (Note NHLBI topics of interest includes mechanical ventilation)	Feb 5 2016	May 7 2016	unspecified	<a href="http://www.grants.gov/web/grants/view-opportunity.html?oppld=223856">http://www.grants.gov/web/grants/view-opportunity.html?oppld=223856</a>

For more funding opportunities: <http://ameriburn.site-ym.com/blogpost/897549/Research-Committee>



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