Breaking Down the Silos in Human and Animal Medicine

Proposal for Developing a Platform that Enables Collaboration Between Animal and Human Medicine/Science Researchers

Tag Words: Medicine, veterinary, animals, physicians, doctors, veterinarians, silos, research, InnoCentive, DemocracyOS, Pharmaceutical companies

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Summary: Human and animal medicine has long been viewed as distinct fields; despite having one huge similarity - medicine. The lack of sharing amongst the disciplines, the lack of shared knowledge, and the lack of communication all contribute to this silo-ization between human and animal medicine. Online platforms and forums that promote the sharing of ideas and information that may help to bridge the gap between these silos are proposed.

Video Link: https://www.youtube.com/watch?v=BGtWpQM71Y

The Issue: The Need to De-Silo ize Human and Animal Medicine (JF, MB)

Human medicine and animal medicine are generally thought of as separate fields. Doctors practicing human medicine often do not share information with veterinarians and vice versa. Medical practitioners in academia tend to work within their own silo, doing research on whatever specific focus, essentially oblivious to what is being investigated on the veterinary side. However, a seemingly separate, but burgeoning industry has evolved that merges animal and human health to develop health and pharmaceutical products that benefit both humans and animals. Academic medicine (with human and animal patients), on the other hand, is lagging behind as they are still stuck in their silos.

The lack of communication holds back opportunities for helping patients, developing pharmaceuticals, and acquiring knowledge of human and animal health systems. Without this communication, the knowledge that could be shared to create more tools and better professionals is lost. Even the way of teaching students content and principles common to both medical doctors and veterinarians is segregated. The way to break down the silos between these two fields is making doctors and veterinarians aware of the issue and giving them the resources to communicate and teach each other.

As we learn more about each of the different species, the more we realize how many commonalities there really are. Pharmaceuticals directed toward one disease in an animal or human are frequently found to be beneficial for other like conditions in other species. The de-siloizing of human and animal medicine will lead to more opportunities for each.

The Problem: Lack of Sharing Amongst the Disciplines (MY)
It is unfortunate for both human and animal patients that the medical communities (veterinarians and physicians) do not communicate, train or otherwise share information with one another. This problem can be broken down and tackled in three parts; a lack of shared knowledge, a lack of communication, and a lack of shared teaching. All three aspects are different but contribute to the gap between veterinary medicine and human medicine.

To tackle the first problem, a lack of shared knowledge, it is imperative to create a system to bridge the human and veterinary medicine “silos”. Many medical journals do not include veterinary studies and vice versa. More journals that focus on both human and animal health, like the One Health Journal [http://www.onehealthinitiative.com/journals.php](http://www.onehealthinitiative.com/journals.php) (1), would provide an outlet for communicating the shared knowledge.

Secondly, there is a problem with a lack of communication. One way to combat this lack of communication between veterinarians and physicians is to introduce more joint conferences, journals, and information sharing sites that involve and are open to both veterinarians and physicians. Another more direct approach is to provide an incentive for veterinarians and physicians to work together, perhaps like what “Innocentive” has accomplished (2). Realizing the importance of this collaboration, it is also hoped that more federal grants will become available that have a clear stated requirement in the request for proposal for a joint collaboration between animal and human researchers.

Lastly, there is a problem with a lack of shared teaching. Veterinarians and physicians generally do not see each other as peers and as such, they do not consult each other. One effective way to create the sense that physicians and veterinarians are peers is to have a shared learning system, where medical students and veterinary students learn some of the core coursework together. Certain schools such as Texas A&M have started to implement this idea of a combined teaching programs [http://vetmed.tamu.edu/](http://vetmed.tamu.edu/) and it is important for other schools to do the same (3).

**The Problem: Lack of shared knowledge (MY)**
The lack of shared knowledge is what creates the two separate “silos” between human and veterinary medicine. We use the term silos to describe each field because of the distinct separations between the fields, despite how closely related they may seem. Physicians and veterinarians currently possess their own means of communications within their own fields. Veterinarians and physicians both have forum-based websites. These websites are used to answer anything from common questions to more complex medical anomalies. However, while these said forums are great for their individual fields, they are often exclusive to only those professionals in that field and people from other fields will not be able to access the information. The downside to this is that, while there might be relevant information to both human and animal medicine, the exclusivity keeps any major medical breakthrough to be shared and utilized to its fullest.

Another common form of communication for the scientific community are medical journals. Similarly to the forums, there currently are many journals that have relevance to only one field of medicine at a time. There are many veterinary/animal health journals and even more medical journals but there are not many journals that combine both.
There have been attempts to solve this problem and unite the two fields by creating a medical journal that is relatable to both human and animal medicine. One such journal has the name “One Health”, and while it may seem like a good idea in theory, there is a lack of awareness of the existence of this journal. Ideas of “One Health” are becoming more and more important as our society faces issues regarding public health, pet care, and food safety.

In order to successfully bridge this gap between the two silos of medicine, there needs to be more common communication in the forms of journals, and forums etc. In addition to this, after setting up said communications, it then requires a lot of publicizing to urge the two respective fields to communicate with each other.

The Problem: Lack of communication (MB)

Lack of communication is an issue creating a silo in the fields of human medicine and veterinary medicine. Medical doctors and Veterinarians often do not think that their problems relate to one another, however they are often very similar. “There is a cost divide between human and animal medicine remains. We also lose the broader understanding and context for diseases that could de-stigmatize many of these conditions. Human medicine must reach across the species divide and join veterinarians in their species-spanning approach to medicine (4). The “One Health” idea has been emerging within the medical community, but is having trouble picking up much speed. One health is a longstanding concept, which promotes the idea that there are few differences between animal and human medicine. The vision died for some time, but has been reborn and is working to become the new standard (5). Some physicians recognize the importance of spanning information over the different fields (6). This recognition in the need for breaking down the silos is important for public health and the well-being of all living things on this planet.

Physicians and veterinarians take care of many of the same conditions in their patients, yet why do they not collaborate like many specialists would in each respective field? Physicians usually do not think to collaborate with veterinarians, attend veterinary conferences, or look into veterinary case studies. The book Zoobiquity highlights problems that overlap between humans and animals. “Zoobiquity springs from a simple but revelatory fact: Animals and humans get the same diseases, yet physicians and veterinarians rarely consult with one another (7).” Self-harm is seen in humans and animals and are handled completely differently. Problems such as depression, anxiety, obesity, cancer, and developmental problems all are prevalent in both humans and animals. Mental illness in animals particularly is looked at by doctors to evaluate the treatment and behaviors for human health (8).

Doctors recognize the advancement in the species of humans. They often hold onto that pride and do not see it as worthwhile to consult a veterinarian. Many do not see the value in collaborating with veterinarians, even though veterinarians are also practicing doctors seeing cases daily. Collaboration today is seen most in public health. Veterinarians in the Army are inspecting food and production animals all over the globe, monitoring disease, and caring for animals everywhere (9). Veterinary doctors who wanted to pursue being a medical doctor work in public health after earning their veterinary degree (10).

The problem: Teaching in veterinary schools (KO)
One problem is that veterinary and medical schools are totally independent of one another. Vet schools and medical schools are typically separated both in physical location and in their mentality with the thought that humans and animals are so different that medicine and practice cannot be shared between them. A little bit of effort into finding places of overlap and combining them would go a long way into bridging the gap. One example of how this can be helpful is Barbara Natterson-Horowitz explaining in her TED talk that physicians have started treating illness, like emotionally induced conditions similarly to illnesses normally experienced in animals and regularly treated by veterinarians (6). Combining veterinary and medical teaching would assist in providing such information and would likely help to improve patient care. This could start by hiring professors in both medical and veterinary schools that are trained to teach basic lessons from the other discipline; i.e. have physicians teach at a veterinary schools and veterinarians teach at a medical schools. This would demonstrate to their professionals that there are similarities and benefits of understanding the similarities and differences of their patients and give reason as to why they should care about the other species’ diseases/conditions. Knowing from the start how similar or different some of the practices are and the possibility that research in one may be a solution or treatment for another may foster a more helpful community of practicing physician, veterinarians and those that do research.

It may be easier to introduce the concept of “one health” in a learning environment than to introduce it to professionals already in practice (though it should still largely be introduced to them as well) because learning from the start is easier than playing catchup. Texas A&M has introduced and is creating a community who can bridge this divide that we feel is too large to ignore (3). More communities like Texas A&M’s one health initiative that combines teaching and research in a way that is a forward movement, would better all species.

**Partners in breaking down the silos**

To bring together these communities there needs to be coordination by many different groups to ultimately make a difference. Everyone involved in animal and human health care needs to come together to solve these issues. Human and animal researchers need to pool their efforts to share results more readily. Something needs to be done about the long process that precedes the ability to use research gathered in studies to better the lives of those that the research is being done for. The combined effort of these researchers, both human and animal focused studies, will further propel the one health movement. Animal researchers have found reason to believe that, through examination of animal DNA, they are finding more out about human diseases and disorders. A study done to take a look at canine genetics and personality has found that because dogs live in such close quarters with humans, and being exposed to the same environment, they are becoming a more valuable model for comparison with humans than lab rats are (11). Sharing the results of such studies will surely benefit all patients whether human or animal.

Practitioners of human and animal medicine need also to come together, sharing the data they acquire in everyday practice. If physicians and veterinarians shared knowledge and accepted knowledge from each other, there would be no gap in care. A dog that has an anxiety problem would then have a veterinarian caring for it who has access to knowledge of a psychologist treating a human with a similar anxiety issue; being that there is much more known about human anxiety, then the dog would receive the optimal care. The same could be true for using veterinary knowledge to tackle human health issues. All of these overlaps could be used for great gain in
health care. This sharing of knowledge would also translate into financial gains for companies serving either animal or human health care.

**Financial Gain of a Silo Breakdown**
There is a lot of potential for financial gains in terms of products and drugs being developed and sold for uses in both animal and human health. When pharmaceuticals for both animal and human patients are studied in depth, it will likely lead to more drugs developed or having more uses, resulting in a larger more lucrative market for these drugs.

**Evolving Market for Animal and Human Pharmaceuticals (MB)**
Pharmaceutical companies have since evolved with the idea that human and animal medicine share similarities. Tools such as vaccinations for influenza may be similar as well. It is common knowledge that the human vaccine for influenza are different every year to account for the plasticity of the flu and the new strain developed. Companies such as Zoetis and Merck recognize the need for a new strain vaccine development for canine influenza (12). By vaccinating dogs for the new strain, it helps prevent the strain from spreading. This shows the similarities between just one component of human and animal medicine. The evolution of companies is seen in the pharmacy component of medicine. Many companies that were originally manufacturers for human medicine also manufacture for veterinary use or wind up spinning off a separate company. Pfizer spun off the animal pharmaceutical company Zoetis, and Merck started the company Merial and then sold that off to Sanofi which may be in the process (as of Dec 2015) of selling or spinning this off to Boehringer-Ingelheim. GSK, Novartis and Lilly recently did some swapping where now Lilly is in control of Novartis’s animal health business. Drug companies are creating empires to serve both human and animal fields. The pharmaceutical empires obviously see enormous financial value in bridging the animal/human health divide.

**Products already developed for use in animal and human medicine alike (KO)**
Collaboration between animal and human medicine in terms of products developed and adaptive to all areas of medicine is a common phenomenon. Syringes, used in all areas of medicine for intramuscular, subcutaneous and intravenous drug injection were originally developed and tested on dogs, injecting them with opium (13). The drug metronidazole has also been used widely throughout human and animal medicine as an antibiotic in the treatment of Giardia in pets and in the treatment of a variety of bacterial infections in humans, ranging from skin infections to respiratory infections (14). There are also a wide variety of thyroid treatment medications used in animal and human medicine alike. The major difference in the usage of drugs proven to be effective in both animals and humans is the dosages. Differences are due to the enormous differences in the size of animals (which in dogs can range greatly, i.e. Great Danes vs Chihuahuas), and differences in metabolisms which also varies greatly in animals compared to humans. The list of products developed for one species and brought or tested on another, is endless.

**Community Action: Proposal to Build a Platform to Enable Collaboration Between Animal and Human Medicine/Science Researchers**

**Using Social Media to Bridge the Gap (MB)**
A possible solution to solve this problem of lack of communication between medical doctors and veterinarians is to create a way for professionals to communicate between fields. A forum for both fields could be created so that all doctors can join together to discuss cases and issues they come across. These forums exist for medical doctors and veterinary doctors, but not both. We created the Twitter handle @RUColloquium to showcase the availability and ease of access of this information. Twitter users can apply appropriate hashtags, such as #onehealth or #zoobiquity to tweets to unite and connect the fields. This twitter account would connect hospitals of humans and animals alike and post questions raised by doctors of all species to generate thinking and unity across all fields. Social media is a powerful tool and can be used to revolutionize the fields and the worldwide view of medicine. A “One Health” world is possible with proper communication between all doctors working for better health.

Using Financial and Ideation Incentives to Bridge the Gap (MY, JF)

Another solution would be to provide an incentive for vets and physicians to work together. The website “Innocentive.com” provides monetary rewards in exchange for solving a community problem. Innocentive.com, exists as a forum based platform that poses questions in a large variety of fields, such as engineering, environmental science, etc. The interesting thing about this website is that it is open to anyone in the community who wishes to contribute. The questions/problems needing solving are posted publically on the website, and then people can work toward providing a solution and submit their solutions with accompanying details by the due date. In return for their efforts, the winner with the best solution receives a monetary reward that is paid for by the agency that posted the question. This is a great way to provide incentives for anyone, whether it be a student, homeowner or professional, that feels that they may have a potential solution, to share it.

We believe that Innocentive would be a great tool for getting medical practitioners, human or animal to work together to solve problems that are common to both animal and human issues. InnoCentive recently posted on 11/9/2015 a challenge titled “Application of Human Drug Treatments to Animal Health” with the description:

“There is growing interest in understanding which human health therapeutics should be developed for use in animal health. The Seeker is looking for innovative solutions that include justifications for human drug selections along with specific companion animal (cats and dogs) and/or food animal (dairy, beef, poultry, swine, fish) disease targets.” The challenge overview/instructions for the potential solvers as stated on the InnoCentive website: “There is growing interest in understanding which human health therapeutics should be developed for use in animal health. The ideal submission would answer the following questions:
1. What are the top three to five drug treatments currently used in human health that also have undeveloped animal health applications?
2. What could each of these be developed for within animal health disease? Explain why and for what specific animal diseases.

The Seeker is looking for innovative solutions that include justifications for human drug selections along with specific companion animal (cats and dogs) and/or food animal (dairy, beef, poultry, swine, fish) disease targets.” This particular challenge was open for a month (closed on Dec 9, 2015), had 183 solvers, and the winner of the challenge (which is under evaluation as of this writing in Dec 2015) will receive $20,000.”
Animal and human health professionals (and anyone really) would first register to be a problem solver by going to https://www.innocentive.com/ar/registration. They would then be able to provide their solution to real life problems therefore making a real impact to both human and animal health. If their solution is chosen by the sponsor of the posed problem, they could win cash prizes from $5,000 to $1,000,000! To put up a specific problem/question for the community to solve, the company/agency would contact InnoCentive by calling 1-855-CROWDNOW (1-855-276-9366) to speak directly with a representative or by contacting them online at “Contact us now online”.

We decided to write to InnoCentive to ask them how we could to inform individuals in the animal and human health field of such challenges and potentially help to get more companies to put up challenges. The message below was sent through their website portal

“Dear InnoCentive Team,

We believe that there are like challenges that face both animal and human health that go unsolved unnecessarily. Solutions to particular health problems in one species may very well work in another. Veterinary and human medicine both use similar resources, tools and skills to achieve a common end goal; to prolong a healthy lifestyle, and to improve the quality of medicine. The problem is that there are limited tools/programs that foster bridging this gap between human and animal health.

The InnoCentive challenges offer a unique opportunity to bring together ideas and expertise from scientists and practitioners to solve problems. Many of the challenges that you have sponsored have addressed human and animal health related issues in some manner. Challenges which directly address the commonalities between animal and human health like “Application of Human Drug Treatments to Animal Health”( Challenge ID: 9933809) are particularly relevant. Have there been many other InnoCentive challenges that help solve a like problem in another species (like a dog health-related challenge that wound up being beneficial for humans)?

How does InnoCentive reach out to 1) new clients proposing and funding the challenge and 2) new problem solver registrants? Is there something we could do in this respect to promote bridging this gap between human and animal health?

We look forward to your response.

Sincerely,

Professor Julie M. Fagan, Ph.D.
xxx@rutgers.edu
with students Michael Chi Yee, Marisa Beckett and Kyle O’Neill
Rutgers University
School of Environmental and Biological Sciences
New Brunswick, NJ 08903
Need for a Collaborative Website to Bridge the Gap
In addition to individual challenges from companies seeking solutions from the public, such as what InnoCentive aims to accomplish, we believe a multidisciplinary online website that fosters open conversations between animal and human health scientists should be developed. One might imagine that this website would have a forum where animal and human health professionals could post their questions, observations and ideas that other scientists could then comment on. Such discussions could lead to more informed professionals as well as initiating collaborations between fields that may not have otherwise come together. Additionally, the site might have software that would be designed to support the joint building of proposals by health professionals.

“democracyos.org” (MB, JF)
A new website designed to bridge the gap amongst human and animal health professionals could be modeled after DemocracyOS (http://democracyos.org/) with their open debate political forum, a site which was originally designed for the citizens of Buenos Aires to get informed, debate and vote on bills presented in Congress. This is a website where users can submit a problem or idea, have other individuals comment and debate on that idea and come to a decision that leads to a solving of the problem (15). Our idea is to modify this platform to fit the animal and human health care community so that physicians and veterinarians could post and openly discuss their issues pertaining to a patient or the practice in general. The open source nature allows it to be accessed by many people across the globe enabling health professionals from all fields of medicine to communicate easily and effectively. The multi-language characteristic of the platform would also be beneficial to use in the medical field. New and groundbreaking solutions and ideas would be available for everyone and those who had put forth and tested these ideas would receive accolades from both medical communities, This would help put forth the idea that individual professionals could be recognized for their work while sharing it, hopefully curbing the practice of keeping ideas secret for fear of someone else getting the patent, grant or paper accepted and published first.

DemocracyOS was originally designed to bring the political system into the modern era as many modern democracies still have participants interact with officials the same way they did hundreds of years ago. DemocracyOS aims to have citizens directly debating on proposals when representatives are actually voting on them (12). An important feature of DemocracyOS is its common platform that anyone in any city, state, or country can use. It allows every issue to be open so that all citizens have the ability to participate and vote. In the era of protest and debate, DemocracyOS is a powerful and useful tool to mobilize citizens who are politically active.

“democracyos.org”: The Devil is in the Details (JF)
The democracyos.org site has several different features; enabling anyone to build proposals, to debate and discuss the issues in an open forum and decision-making tools where people can vote on issues happening then and there, getting immediate feedback. Because it is open source, it allows anyone to build their own site to suit their needs. On democracyos, they have a link to “Civic Stack” (civicstack.org), a repository of open source civic engagement applications that others have developed using the software developed by democracyos in other countries. Here the viewer can visualize how others have used the open source software and then use these as models for their own, essentially collectively designed platform. Developing one’s own site, one
would start by Installing DemocracyOS (http://docs.democracyos.org/), then go to the Develop section with DemocracyOS up and running on production (read one of the Deploy guides). One would then choose the technology: Javascript, NodeJS & NPM for server side code, Babel.js for all the ES2015 magic on client side, Browserify for client side bundles, Stylus for css styles, Jade for templating, MongoDB for storing data, or Mongoose for modeling application data. Also on the website is a blog to discuss technical issues regarding program development, debugging programs, etc: https://gitter.im/DemocracyOS/democracyos.

Those launching live instances of DemocracyOS are requested to email Mair Williams (mair [at] democracyos.org) so they can help with communication from their networks and provide information on any new features that the site may have to offer. Although we are not yet ready to build a site, we wrote to the DemocracyOS team to inquire about whether they know of other groups that have developed a website that would have similar properties to one we envision for the animal and human health field.

Sent to: contacto@democraciaenred.org, speak@democracyos.org and mair@democracyos.org

"Dear DemocracyOS Team,

The many features of your open-source, multi-language DemocracyOS platform may be a viable platform to promote communication amongst professionals in the animal and human health care industry. Although these industries share many commonalities, they tend to function as totally separate fields. My team and I are very interested in using a DemocracyOS - like platform to reach out to health professionals in the human and animal fields. Our goal is to unite professionals to encourage collaborative research, enable the answering of previously undiagnosable illnesses, and to further both animal and human health.

We envision your proposal feature of your democracyos.org site to be useful in putting practitioners together to conduct research and write grants, your debate feature to act as a discussion forum amongst practitioners and researchers, and the “vote” feature to perhaps enable researchers to administer surveys. Might you have some other ideas for how your platform could be utilized to better communication in the health care/medicine field? We do not see a group on your “Civicstack” page that uses their platform for such a purpose but perhaps there may be some features of some of these groups that you are aware of that would be useful toward our goal. And might you have some ideas on how to market a new platform to physicians, veterinarians and research scientists?

We look forward to your response.

Sincerely,

Professor Julie M. Fagan, Ph.D.
xxx@rutgers.edu
with students Michael Chi Yee, Marisa Beckett and Kyle O’Neill
Rutgers University
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Reaching out to the Practitioners
We have drafted a letter (below) that could be sent to veterinary and medical practitioners (once the platform was created) to encourage their participation in advancing the human-animal (“One-Health” health field.

“Dear Medical/ Veterinary school supervisor,
I’m writing to inform you of a new platform that will revolutionize health care for physicians and veterinarians. This platform, One-Health-OS, will provide doctors of all species with access to all levels of information from forum posting, database information and an input system to better improve and integrate all aspects of health care.

One-Health-OS will allow veterinary medicine and human medicine to converge by providing an open communication of the practitioners. Healthcare in all species is more closely related than most people think and by helping to merge these branches will further facilitate learning and better care. The lack of communication between fields will be gapped through this platform by providing information and an open source forum. This forum will be open to everyone and have postings by doctors and veterinarians about cases they are experiencing in their practices. The poster would have a question about their patient, something they themselves cannot solve. Other health care professionals would be encouraged to post ideas about how to solve the problem; medications or procedures to use that would work in other species or are known to work in the subject species. The solutions could be voted on and the working solution would be promoted. In cases where the solution was a groundbreaking discovery, something that had not been thought of before, the provider of the idea would get credit, having a record that he or she had come up with the idea, so that they can still submit their research on it. This would encourage people to not keep secret their ideas that could be used to save lives.

This service is important in merging the gap between human and animal medicine and could help solve many problems in an effort to save lives of humans and animals, and we would like you to become a part of this revolution by using and promoting our service at your school.

Thank you

References

Letters to the editor:

To Burlington County Times  
bctletters@calkins.com  

Marisa Beckett  

November 1st, 2015  

Dear Editor,
There is an issue in our society that is affecting both humans and animals. Veterinarians and human physicians share common career goals; providing health care for others. The only thing that varies is the species they treat. Though they fall under the umbrella of health care these fields are treated as though they are different worlds and as such share very little communication. The gap between human and animal medicine occurs due to a lack of shared knowledge, a lack of communication, and a lack of shared teachings. There are no combined journals, seminars, or conferences.

A solution to this problem is the idea of one health within the fields. One health views medicine as a whole rather than two separate entities. By adapting the idea of ‘One health’, forums and journals can be made that have applications to medicine as a whole and not just animal or veterinary medicine. A solution involves combining teaching, sharing information, and making professionals aware of the problem. An open-source environment with the idea that nothing is secret would benefit all patients across the board to advance research and medicine. A platform should be created so that medical doctors and veterinarians can communicate constantly and openly about issues and developments.

Sincerely,

Marisa Beckett
Rutgers University Undergraduate Student
New Brunswick, NJ

To Jackson Times

Kyle O’Neill

Dear Editor,

In the medical communities there is a serious problem affecting two branches of health care that could work together so well, but there is a missed opportunity. Veterinarians and human physicians are treating the other field as a separate and foreign entity where they could use this as a wealth of knowledge and further better the healthcare of all species.

There is little consultation between these very relatable fields and many important interactions are being missed. An easy solution would be to congregate these two fields along with researchers who perform studies for shared drugs and procedures. Steps are being taken by organizations to see this gap lessen but more work can be done. My group has discussed a method of bringing the fields of human medicine and animal medicine closer together through social networking and an internet database to better foster greater understanding of health for all species. We developed an idea for a website based off of democracyOS that de-siloizes veterinary and human medicine and allows users to add their own ideas and experiences to better all health care.
Part of this effort is to gain interest from our communities and show what we have created in hopes to spread our idea or message.

Sincerely,
Kyle O’Neill