

## 2017 Marion Woodward Lecture

# Mental Illness & Substance Use

Deborah S. Finnell

This year's focus on mental health and substance use problems provides me with the opportunity to discuss one of the most vulnerable and stigmatized populations in the world. Given the prevalence of these disorders and the ever present headlines about the opioid use epidemic every one of us is impacted as members of society as healthcare providers and educators.

I have three areas that I will address tonight. For each I will talk about what is known and provide examples of what I have done in each of these areas. I will end by presenting what I believe still needs to be done and there is much to be done.

**Mental and substance use disorders are brain-based.**

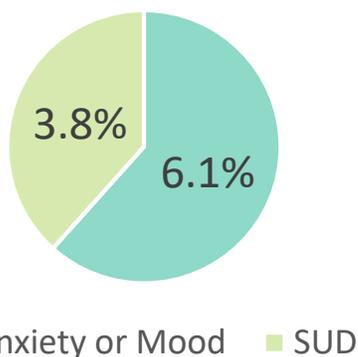
**Words matter.**

**It is essential to build capacity of the nursing workforce to address the needs of these vulnerable populations.**

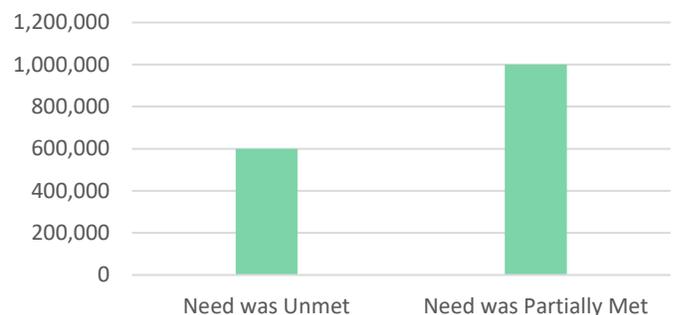
My goal is to urge you to examine your perceptions and your paradigms about mental and substance use disorders and challenge you to consider how you can help to remove the stigma that is a significant barrier for this vulnerable population as they seek and receive health care.

Why is this important? According to the 2012 Canadian Community Health Survey on Mental Health, 6.1% of the Canadian Household Population aged 16-24 had a mood or anxiety disorder in the previous year and 3.8% had a substance use disorder. About 4.9 million Canadians aged 15 and older expressed a need for mental health care and 600,000 felt that need was unmet. 1 million thought the need was partially met. 39% of those 15 – 24 years old consulted a resource about emotions, mental health, alcohol or drug use in the previous year.

Disorders among Age 16-24



4.9 Million Canadians over 15 years old Needed Mental Health Care



So keeping in mind that nurses are among the most trusted profession, we have the closest contact with patients, and we have the most prolonged time with patients, we can help to address some of the needs of this population if we have the will to do so.

In the Afternoon Symposium panel we talked a lot about stigma. From the Mental Health Commission of Canada, 2013, stigma is one of the key barriers to keeping people from seeking treatment.

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## *Stigma engenders:*

*Labelling*

*Stereotyping*

*Fear of people with mental illness*

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### MENTAL AND SUBSTANCE USE DISORDERS ARE BRAIN-BASED.

Advances in neurosciences have led to a better understanding of the brain's structure and function, yet what do we mean when we say brain-based disorders? These disorders result from neurobiological dysfunctions that make an individual sensitive to both internal and external stimuli. The criteria for these disorders are outlined in the *Diagnostic and Statistical Manual (DSM)* and they are based on what we can observe and on what the person reports, but not on etiology. The evidence points to structural and neurochemical dysfunctions. This omission in the DSM, I believe, reinforces the behavioural paradigm that the person should be able to control his or her behaviour. It also reinforces the moral paradigm that in failing to control themselves, these people are weak-willed or somehow personally responsible. To stop the stigma, we must focus on what we cannot directly observe: that which is disordered in the brain.

How many times have you heard someone say, "Why can't you control your drinking?" "Why can't you control your anger or your impulses?" If the human brain has on average up to 86 billion neurons with an average of 7,000 connections each<sup>1</sup>, how much control do we have over its functions? We can't control why we get these impulses, but we are responsible for managing our thoughts, our feelings, and our behaviours. The central area of the brain, the limbic brain, is the primary driving force for our survival. Notably, the limbic brain is unconscious. It has no language, and no conscience.

Buried deep in the centre of the brain, the limbic brain is concerned with both subjective emotional experiences and with changes in body functions associated with emotional states. The limbic system is intimately wired to other structures of the brain. It's involved in aggressive and sexual behaviour and it's also implicated with pleasure, memory and learning. The manufacturing sites for the key neurotransmitters – dopamine, serotonin and norepinephrine are located here.

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<sup>1</sup> Azevdeo, et al., 2009; Pakkenbuerg, et al., 2003

## DOPAMINE

Manufactured in the substantia nigra, dopamine is associated with pleasure. This gives us our sense of well-being and is responsible for our appetite and reward-seeking behaviour. Neurons lead from the *Substantia nigra* to the frontal lobe where the frontal cortex is dealing with those most integrative brain functions thinking, conceptualizing and planning. A disorder of this system therefore will impact decision-making. Excess levels of dopamine give rise to exhilaration, superior confidence, a sense of power and control and joyous excitement. Such conditions might be associated with schizophrenia, mania and cocaine intoxication. Dopamine deficits correspond to a loss of pleasure, feeling empty and joylessness.

A common feature of alcohol and other drugs is their ability to activate specific areas of the brain that give rise to those pleasurable feelings of reward, motivation and reinforcement. This reward pathway is the mesolimbic dopamine system.<sup>2</sup> Though particular substances have different mechanisms of action, each increase the activity of the reward pathway by increasing dopamine and along with it, that sense of exhilaration and pleasure.

## NOREPINEPHRINE

Here the Locus coeruleus manufactures norepinephrine. This neurotransmitter is associated with our fight or flight response. Here the projections ascend to the higher brain centres that regulate attention, arousal, and our sleep/wake cycle. Excess norepinephrine is associated with extreme anxiety, panic states, loss of appetite, aggression, and violence. Deficits are associated with thought confusion, acute depression, chronic fatigue, lethargy, loss of sexual drive, and hyperactivity as we may see manifested in people with Attention Deficit Hyperactivity Disorder.

## SEROTONIN

Perhaps one of the systems that's more widely known is the Serotonin system. Here the raphe nuclei in the pons and in the mid-brain innervate the entire brain. These nuclei manufacture serotonin, a neurotransmitter that has a prominent role in mental disorders, especially in affective disorders. Serotonin inhibits our activity and behaviour. It controls rhythms, sleep, cycles, mood states, and it plays a role in the perception of pain, and regulation of temperature, reduces feeding, aggression, play and sexual activity. Excess levels of serotonin are associated with hypo-activity, increased sleep time, behavioural inhibition, fearfulness, and harm avoidance, while deficit levels are associated with hyperactivity, jitteriness, aggression, paranoia, insomnia, and impulsivity and depression. Serotonergic dysfunction has been associated with increased lethal suicide attempts and suicide.

Homeostasis is a key principal to understanding these brain-based disorders. For some, balance or "feeling normal" may be experienced when they consume alcohol or drugs. Why is that? Well, to use an example, endorphin regulates our pain perception. A low endorphin level translates into a heightened perception of pain. Ingesting heroin promotes endorphin release and it gives that sense of well-being, relaxation, and a feeling of being capable of handling any form of stress and anxiety. That acute effect is followed by an opposing neuro-adaptation and the response is tolerance; a need for markedly increased amounts of an opiate to achieve the desired effect, or a markedly diminished effect with continued use of the same amount of opiate. A withdrawal syndrome occurs as the drug is excreted from the body. In turn, there's a neuro-adaptation and a physiological adaptation to restore equilibrium and an opiate-

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<sup>2</sup> National Institute on Drug Abuse (2016)

free state. The experience of craving, that is a strong desire to use the opiate, is neuro-biologically driven and that helps to explain why a person continues to use the drug despite the consequences.

We do make observations and assumptions based on a person's affect, appearance, behaviour, and speech. These are branches of the human tree. Those branches constitute the moral and the



*There are a thousand hacking at the branches of a problem ... to one who is striking at the root.*

behavioural paradigms. They form our attitudes and our perceptions about others and may inadvertently contribute to the stigma experienced by persons with mental and substance use disorders. I ask you to consider integrating the evidence related to the neurobiological roots, whether it is as a direct care provider, an educator in healthcare or higher education, an administrator, or any other position that you currently hold.

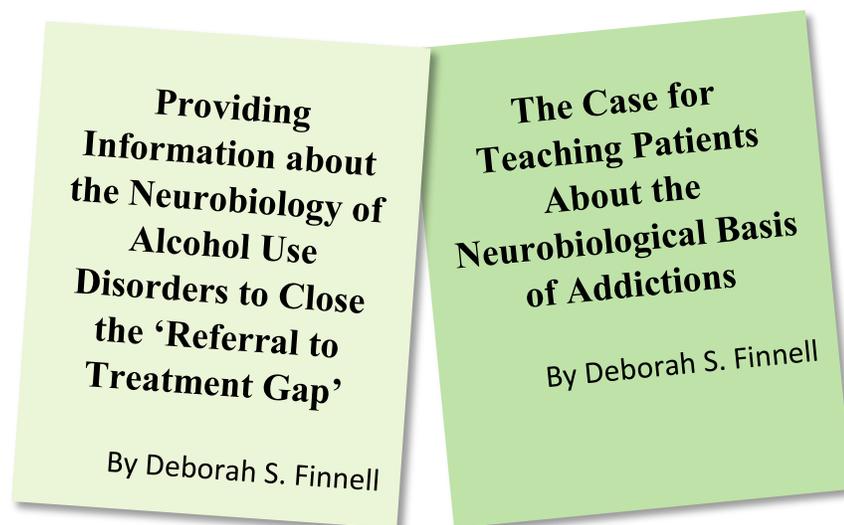
***Advances in science lead to greater understanding and knowledge about the etiology of the disease, treatment and prevention.***

So, knowing about the neurobiological basis is one thing. Feeling it is another. What must it feel like to be empty and joyless? What must it feel like to be profoundly depressed? What must it feel like to have a craving for a substance that leads to use despite the consequences? These are not willful or intentional behaviours. Rather, they are driven by what occurs in the brain stemming from a disorder in the brain structures and functions. Again, I emphasize this in no way recuses the person from being responsible for managing their health condition, yet by shifting the paradigm from a moral one to a biological one, just as has occurred with leprosy, epilepsy, and AIDS, this vulnerable population may experience less shunning and rejection and thus be more willing to seek and accept treatment.

Education about the neuroscience can be used to overcome that stigma that persists because of that

**We can and should translate the evidence to patients, families, and the public.**

moral paradigm. The blaming and shaming people that are afflicted because of their biology rather than addressing them as anyone else with a chronic medical problem that is treatable.



Let me provide some examples of what my colleagues and I have done to promote this message.

One of my first publications was “The Case for Teaching Patients About the Neurobiological Basis of Addictions” and I have been promoting this message for over two decades. It was the responses from my patients that spurred this publication. My practice was grounded on providing that evidence to patients.

#### What were their responses?

“I thought I felt this way and drank because I was weak-willed.”

“I read about this but I understand it more clearly now.”

Others were able to make the connections between their symptoms and their substance use.

“I was depressed before I used cocaine. Now I know why I’m more depressed after I use and stop.”

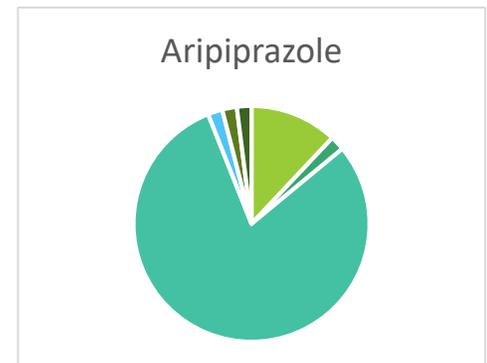
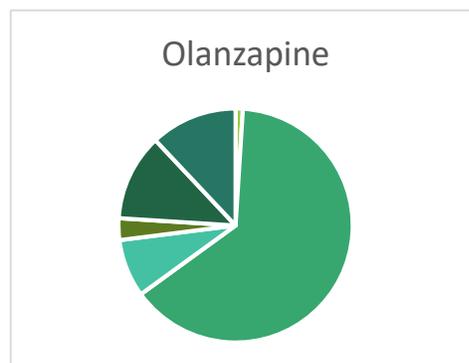
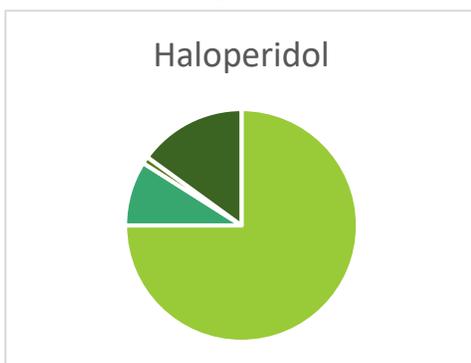
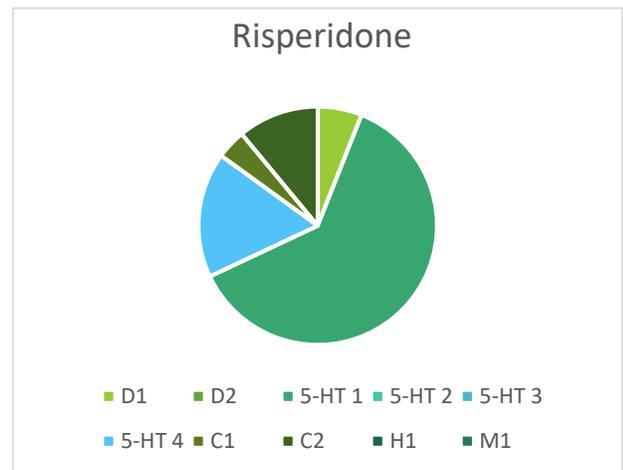
Our 2013 publication in *Nursing Clinics of North America* providing information about the neurobiology of alcohol use disorders to close the referral to treatment gap, was an appeal to nurses to provide this critical health information, to remove the barriers to behaviour change, and to remove the barriers to treatment for persons who could benefit from specialty treatment.

When the first ever US Surgeon General’s report on alcohol, drugs, and health, *Facing Addiction in America*, was published in 2016 (the first ever report – 2016) my fellow board members of the Association for Medical Education and Research in Substance Abuse (fondly known as AMERSA) and I wrote an editorial heralding the publication<sup>3</sup>. Notably, the second chapter of the SG report was devoted to discussing the neurobiology and explaining that substance use occurs along a continuum from at risk use to a substance use disorder. Finally, this evidence was front and centre in a document intended to help inform policy-makers, health-care professionals and the general public about effective, practical, and sustainable practices to address these problems.

<sup>3</sup> Sharon Levy, MD, MPH, J Paul Seale, MD, Victoria A Osborne, PhD, MSW, Kevin L. Kraemer, MD, MSc, Daniel P Alford, MD, MPH, Jeffrey Baxter, MD, Deborah S. Finnell, DNS, Hillary Kunins, MD, MPH, MS, Alexander Y. Walley, MD, MSc, David C. Lewis, MD, Doreen MacLane-Baeder, and Adam J. Gordon, MD, MPH.

In my role as a Nurse Practitioner my prescribing practice was grounded on education related to the brain structures and functions. Rather than vague explanations about auditory hallucinations, for example, I shared scientific publications such as A Meta-analysis of neuroimaging studies.<sup>4</sup> And yes, this is one of the images I used in working with a patient. A patient who believed the auditory hallucinations were due to unseen shrapnel in his head came to accept the scientific evidence. He had been told by a previous provider that taking the anti-psychotic medication would “melt the metal” and the voices would go away.

Also as a practitioner I wanted a deep understanding of the pharmacodynamics and the pharmacokinetics of the medication I was prescribing. I worked with a young man with schizoaffective disorder who was reticent to take medications and he was willing to come into treatment because he had been living in a recreational vehicle and moving between campgrounds in the US to “stay ahead of the enemy.” He was drinking alcohol and smoking marijuana most of his waking hours and as he was in residential treatment, I was able to see him with some frequency. Over the course of three hour-long meetings I provided education about the brain and associated the symptoms he was experiencing with their neurobiological underpinnings. Then I provided information about various anti-



psychotic medications. I used this graphic to explain the differences in the receptor affinities for different medications and gave him the rationale for the medication that I was recommending. The next day he returned asking if he could start Quetiapine at a low dose that I had recommended. The following day he came back saying he slept well for the first time in ages and was feeling no untoward effects. Over the course of time he came back to ask for small increases in medication and then one day he came to my door and he said, “Dr. Finnell, I think I need something that’s going to impact my dopamine receptor sites, specifically the D2 receptor sites.”

So after several years of teaching patients about neurobiology, I secured funding from the Veterans Administration to produce a video. This 20-minute video, *Alcohol and the Brain*<sup>5</sup>, provides information about how alcohol affects the brain; how the brain recovers in response to abstinence or withdrawing

<sup>4</sup> Zmigrod, L., Garrison, J. R., Carr, J., & Simons, J. S. (2016). The neural mechanisms of hallucinations: A quantitative meta-analysis of neuroimaging studies. *Neuroscience & Biobehavioral Reviews*, 69, 113-123.

<sup>5</sup> Brager, J., Rodney, T., & Finnell, D. S. (2017). Informational videos about alcohol use: Feasibility and acceptability. *Journal of the American Psychiatric Nurses Association*, doi: 10.1177/1078390317731816

from alcohol; in response to behavioural or pharmacological treatments; and in response to participation in mutual support groups. I then produced a second video based on the *Rethinking Drinking* booklet from the National Institute on Alcohol Abuse and Alcoholism. This 20-minute video focuses on the dangers of at-risk alcohol use and provides research-based information about drinking; strategies to help people consider whether and when to change drinking; and resources for professional help and mutual help groups.

My doctoral students and I conducted a study wherein we asked participants to choose one video and we measured their current level of risk associated with alcohol, their readiness to reduce alcohol use, and their knowledge related to alcohol.<sup>6</sup> In our sample of 129 adults aged 21 to 65, 31 (24%) chose to watch *Alcohol and the Brain* and 98 (76%) chose to watch *Rethinking Drinking*. 99% of the 116 males and 4% of the 13 females were at risk based on our screening with the alcohol use disorders identification test. Knowledge scores increased slightly from pre- to post-test, and although not significant, those who watched the *Alcohol and the Brain* video increased their readiness to decrease alcohol use after watching the video, and the readiness scores went the opposite direction for those that chose the *Rethinking Drinking* video.

## WORDS MATTER



The words that we intentionally and unintentionally use propagate the stigma experienced by persons with mental and substance use disorders. These words depersonalize people, depriving them of individual and personal qualities and personal identity. In a 2014 publication our editorial board of the *Substance Abuse Journal* appealed to authors, reviewers and readers to:

<sup>6</sup> Brager, Rodney & Finnell 2017

## Use Language That

<p>1. Respects the worth and dignity of all people, or “people-first language.”</p>	<p>2. Focuses on the medical nature of substance-use disorders and treatment.</p>
<p>3. Promotes the recovery process.</p>	<p>4. Avoids perpetuating negative stereotypes and biases through the use of slang and idioms.</p>

In 2015 The International Society of Addiction Journal Editors issued a statement encouraging the use of non-stigmatizing terminology. An endorsing editorial by my colleague Rich Saitz in *the Journal of Addiction Medicine* followed in 2016. In our reviews of manuscripts we refer to our work that we did for the International Society for correcting authors who use stigmatizing language to reduce or hopefully eliminate it from the *Substance Abuse* journal.<sup>7</sup>

In January of 2017, Michael Botticelli, then Director of the US Office of National Drug Control Policy issued a “Memorandum to the Heads of Executive Departments and Agencies” citing those previous publications and the Surgeon General’s report on addictions. Notably, the memo addressed the neurobiological basis of substance use disorders from which people can and do recover. To quote from that memo:

*“Substance Use Disorder, the most severe form of which is referred to as ‘addiction’ is a chronic brain disorder from which people can and do recover. Nonetheless, sometimes the terminology used in the discussion of substance use can suggest that problematic use of substances and substance use disorders are the result of personal failing; that people chose the disorder or that they lack the will power or character to control their substance use. However, research shows addictive substances can lead to dramatic changes in brain function and reduce a person’s ability to control his or her substance use, and that repeated use of these substances powerfully alters brain chemistry and the function of brain circuitry to create a neurobiological disorder.”*

### PERSON-CENTERED PERCEPTION QUESTIONNAIRES

Two common questionnaires that are used to assess perceptions and attitudes are *The Alcohol and Alcohol Problems* questionnaire developed by Shaw and colleagues<sup>8</sup> in 1978 and the *Drug and Drug Perceptions* questionnaire developed in 2006 by Watson and colleagues<sup>9</sup>. Both questionnaires are widely used to measure healthcare providers’ attitudes and

*I feel I have a clear idea of my responsibilities in helping drinkers.*

I feel I have a clear idea of my responsibilities in helping **individuals who drink alcohol**.

*I feel I know how to counsel drug users over the long-term.*

I feel I know how to counsel **individuals who use drugs** over the long-term.

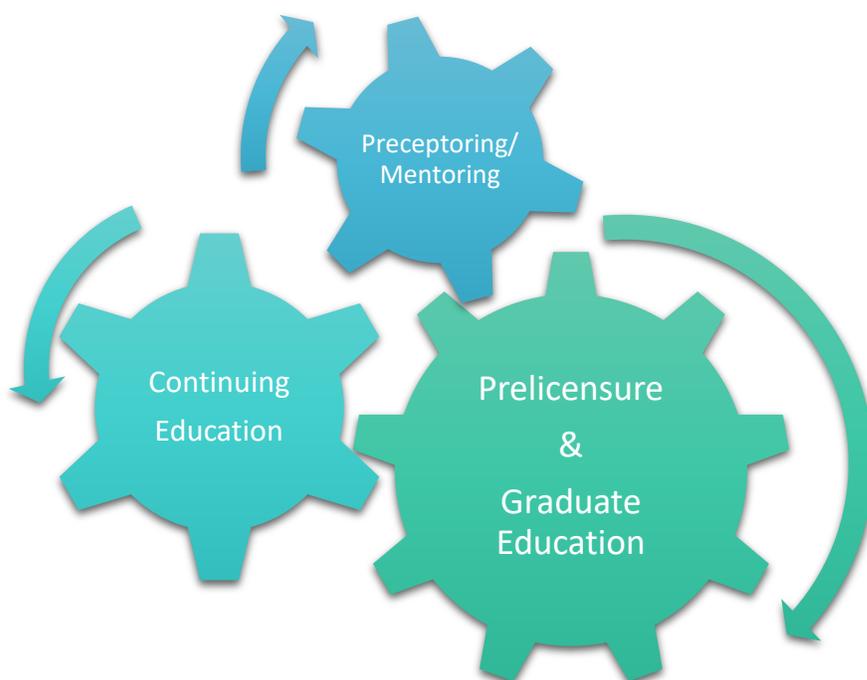
<sup>7</sup> Broyles et al., 2014

<sup>8</sup> Shaw, S., Cartwright, A., Spratley, T., & Harwin, J. (1978).

<sup>9</sup> Watson, H., Maclaren, W., & Kerr, S. (2007).

perceptions. My colleagues and I wanted to administer these questionnaires to our students as part of the project that we were evaluating. Yet as we reviewed the items we noted terminology that is now, years later, viewed as pejorative and stigmatizing. The three of us undertook an independent review of the 30-item alcohol questionnaire and the 20-item drug questionnaire, revising items to develop contemporary person-first questionnaires. We compared our versions and resolved differences to develop the final forms. These first-person measures have been administered to over 400 pre-licensure nursing students at Johns Hopkins School of Nursing and over 200 Master of Science nursing students at the University of Pittsburgh. We will use these data to establish the psychometric properties of these versions of the questionnaires.

**IT IS ESSENTIAL TO BUILD CAPACITY OF THE NURSING WORKFORCE TO ADDRESS THE NEEDS OF THESE VULNERABLE POPULATIONS.**



There is clear evidence that nurses, like many other healthcare providers, are ill-equipped to address the continuum of substance use. When content is included in curricula, the dominant focus is on those with the substance use disorder – that is those at the farthest end of the continuum. While recent efforts have focused on early identification of persons who are at risk because of alcohol and drug use, there has been slow uptake of the evidence in support of screening, brief intervention and referral to treatment in nursing curricula, continuing education, and in healthcare settings.

## Alcohol Content in Baccalaureate Nursing Curricula

# 1 to 30 HOURS

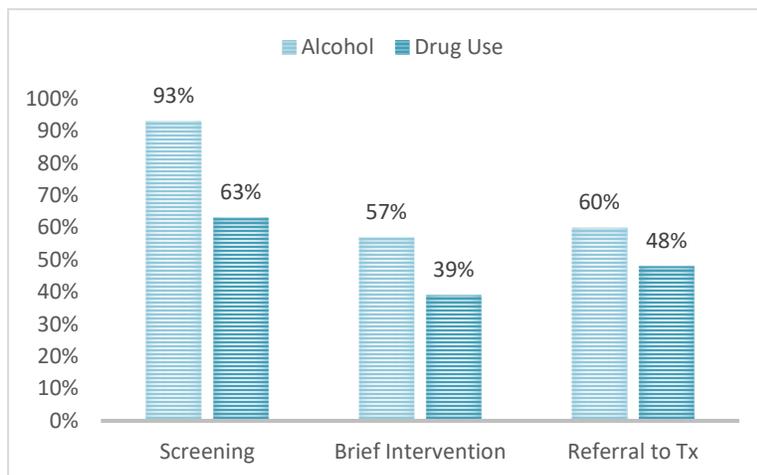
(Hoffman & Heinemann, 1987)

# 3 to 38 HOURS

(Savage, Dyehouse, & Marcus 2014)

In a 1987 study Hoffman & Heinemann reported that there were 1 to 30 contact hours related to alcohol and health among the nursing schools that they surveyed. Nearly three decades later, Savage and her colleagues found the mean number of contact hours related to alcohol and health in Baccalaureate Science of Nursing Curriculum was 11.3 hours with a range of 3 to 38 hours. Over that span of time, we, as a nursing academic community, did little to change this content. The limited content hours related to substance use is concerning considering the serious public health issue of at-risk alcohol and drug use and the high prevalence of use worldwide.

Our team conducted another cross-sectional descriptive study<sup>10</sup> to determine the extent to which screening, brief intervention, and referral to treatment or “SBIRT” content was included in current

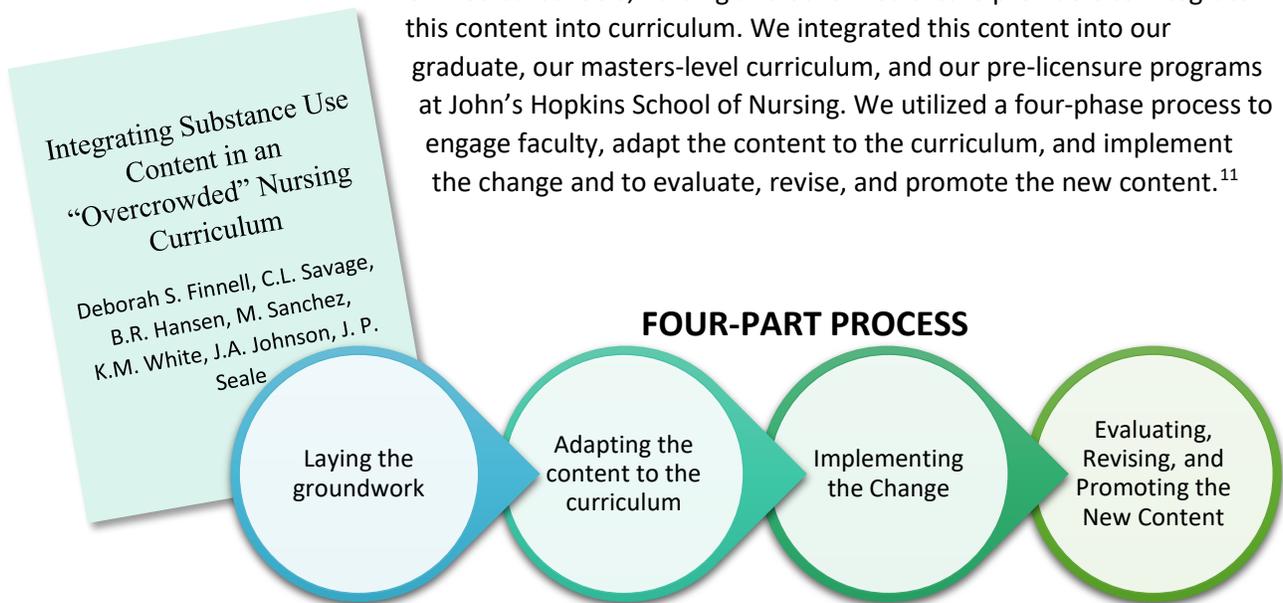


curricula for the advance-practice registered nursing students and we also wanted to know if they were evaluated on their competency to deliver the set of clinical strategies. The survey was distributed electronically to a random selection of US-based APRN programs with 90 responding. The mean number of hours devoted to alcohol drug and tobacco SBIRT was 7.3. Among responding schools, alcohol content was most common with about 93% of the schools. Content on brief intervention, 57% and referral to treatment, 60% was less common than the alcohol screening (*note that fewer schools reported content for drug screening: 63%; note also that this survey was conducted in 2016/2017 as the*

<sup>10</sup> Savage, C. L., Daniels, J., Johnson, J.A., Kesten, K., Finnell, D.S., & Seale, J.P. (2017). The inclusion of substance use-related content in advanced practice registered nurse curricula. *Journal of Professional Nursing*. <http://dx.doi.org/10.1016/j.profnurs.2017.08.006>

*opioid epidemic was raging*) 39% for brief intervention, and referral to treatment at 48%. Less than a quarter of the schools included SBIRT competency assessment for alcohol or drug use.

The United States Substance Abuse Mental Health Services Administration has been providing funding for medical schools, nursing and other healthcare providers to integrate this content into curriculum. We integrated this content into our graduate, our masters-level curriculum, and our pre-licensure programs at John's Hopkins School of Nursing. We utilized a four-phase process to engage faculty, adapt the content to the curriculum, and implement the change and to evaluate, revise, and promote the new content.<sup>11</sup>



We have 13 modules that are integrated into relevant courses across the curriculum. After receiving the core modules, students complete a computer-based simulation where they demonstrate their competency in applying motivational interviewing techniques to engage in a patient-centered conversation and assess, prevent or reduce alcohol use. After completing that program, students submit their certificate of completion as evidence of mastery.

Modules on the neurobiological basis, behaviour change framework, identification and management of withdrawal, and implementing SBIRT in practice are integrated in corresponding courses across the curriculum.

Our work has been guided by the American Association of Colleges of Nursing *Essentials* for Baccalaureate Nursing Practice, for Master’s Education, and for Doctoral Education. The placement of each module is guided by the fit of the content for the course and we developed a document to map the course description, the course objectives, module description and module objectives with the corresponding Essentials from the American Association of Colleges of Nursing. That curriculum map serves as a reference as the overall curriculum is reviewed for ongoing quality and improvement and to ensure that we prevent curricular drift.



<sup>11</sup> Finnell, D. S., Savage, C. L., Hansen, B. R., Sanchez, M., White, K., Johnson, A. J., & Seale, J. P. (2017).

While we were focusing on the future nursing workforce including those seeking advanced practice roles, we realized the need to increase the knowledge and skills of the current nursing workforce. In this project we partnered with colleagues from the University of Pittsburgh, who had similarly received funding from the Centers for Disease Control and Prevention and the American Association of Colleges of Nursing. In this project we developed an online program for all levels of nurses. Two modules provide the foundational content for the program, an overview of alcohol screening and brief intervention, and fetal alcohol spectrum disorder. One module focuses on alcohol interactive medications and six modules focus on the delivery of SBIRT to diverse populations. Three modules were designed to provide information particularly for nurse administrators, clinical nurse leaders, and nurse informaticists, and finally a module focuses specifically on implementing SBIRT in practice. We will be disseminating this soon to the over 3 million registered nurses in the US and beyond.

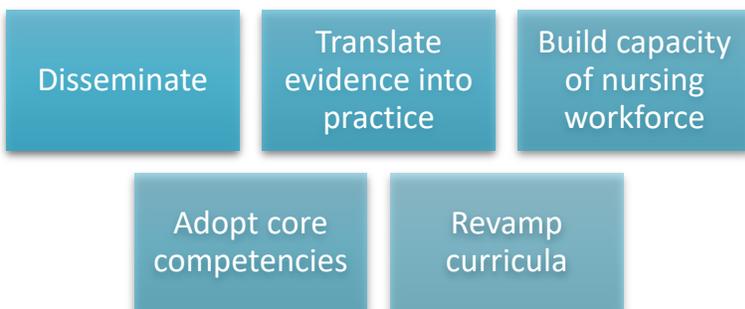


We also developed an online program with funding from the substance Abuse Mental Health Services Administration for healthcare providers who are seeking foundational knowledge related to substance use screening, brief intervention, and referral to treatment as well as for the healthcare provider who is a preceptor or a mentor for a student or a new provider.

This program culminates in a learner observing a healthcare provider implementing a set of clinical strategies and evaluating that interaction using an established SBIRT proficiency checklist. The learner then has the opportunity to see how the SBIRT expert provides feedback to the clinician.

### What is yet to be done?

If we are to change paradigms that are barriers to effectively serving our patients, we must believe the evidence and we must promote the evidence.



It is important for nurses and other healthcare providers to disseminate what we know about the neurobiological basis of mental and substance use disorders to individuals, groups, and populations. We can and should translate this evidence to patients, families, and the public. This message can be

carried through social media, editorials, professional presentations, peer reviewed journals and lay literature. We also need studies to examine the efficacy of providing this information to persons with

these disorders and studies focusing on what type of information is effective and for what types of populations.

Concerns about the seventeen-year time lag in moving research to practice is not new, yet it is unresolved. Greater efforts are needed to translate evidence into practice and such work is ideal for implementation science by the PhD and translational projects by those with a practice doctorate. Greater efforts must be taken to build capacity of the next generation of nurse researchers, of nurse educators, and practitioners to address the global burden of mental and substance use disorders. Nurse leaders should follow suit with initiatives such as your own here, the British Columbia Centre on Substance Use Addiction Nursing Fellowship under the direction of Cheyenne Johnson. We need a global set of core competencies for nurses caring for people across the continuum of substance use. Nurse leaders from Canada, the United States, the UK and other countries are currently undertaking this work.

Nurse leaders in the US have mapped content related to substance use and substance use screening, brief intervention and referral to treatment to the American Association of Colleges of Nursing Essentials for the Baccalaureate, Master's and doctoral Nursing. As we disseminate this work, we encourage nurse educators to revamp their curriculum guided and inspired by our work. Such efforts will help advance the knowledge and skills of nurses across all levels of education so collectively we can address the needs of this vulnerable population.

[dfinnell@jhu.edu](mailto:dfinnell@jhu.edu)

@dsfinnell

[https://nursing.jhu.edu/faculty\\_research/faculty/faculty-director/acutechroniccare/deborah-finnell](https://nursing.jhu.edu/faculty_research/faculty/faculty-director/acutechroniccare/deborah-finnell)

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