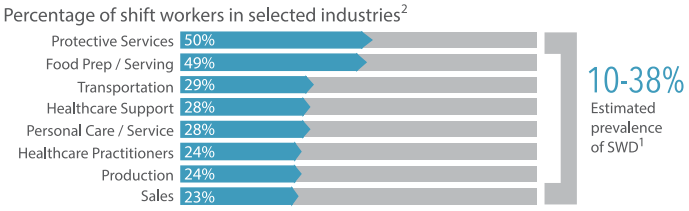
CASE STUDY:

Continuing Medical Education Simulation Identifies Challenges in Diagnosis and Treatment of Shift Work Disorder

Shift Work Disorder is a circadian rhythm sleep disorder that is significantly underdiagnosed in primary care. Using DecisionSim™, experts created a highly interactive, certified Continuing Medical Education simulation for primary care clinicians to improve their understanding of basic sleep assessments and the diagnosis and management of Shift Work Disorder. This simulation resulted in new insights into primary care clinicians' decision processes and uncovered data that helps explain the underdiagnosis of this disorder and provide guidance for future educational activities.

Defining the scope of a growing public health issue.

Nearly 20 percent of the U.S. population are shift workers who go to work during the hours between 10 p.m. and 6 a.m.[1] Studies have shown that Shift Work Disorder (SWD) affects between 10 and 38 percent of these workers whose work/sleep schedule is misaligned. In addition to core symptoms of excessive sleepiness and/or insomnia, shift workers are at greater risk for chronic diseases such as high blood pressure, metabolic disease, gastro-intestinal disorders, and certain cancers.[2,3,4,5] Since SWD remains significantly underdiagnosed and rarely addressed, it poses a significant public health problem.



To help improve the primary care clinicians' ability to diagnose and treat SWD, a team of experts chose the DecisionSim™ simulation platform due to its ability to improve knowledge and enhance decision-making in an engaging, effective and efficient manner. Additionally, the experts were interested in analyzing the rich data produced by the simulation to help them better understand current clinical practice behavior and clinical decision-making.

The team was led by Ardgillan Group LLC, an educational consulting firm with expertise in sleep medicine, along with Dr. Paul Doghramji, MD, FAAFP and primary care physician and Christopher Drake, PhD, a leading sleep researcher with the Henry Ford Medical Center. This simulation was supported by Teva CNS and certified for Continuing Medical Education (CME) credit by pmiCME. It was distributed via pri-med.com, one of the largest online CME providers in the U.S. After 6 months online, approximately 2,000 clinicians had taken part in the simulation.

DecisionSim helps clinicians correctly diagnose and treat SWD.

Leveraging the intuitive DecisionSim authoring tools, the team designed a branched simulation with a discovery learning design to help primary care clinicians improve their diagnosis of SWD. In the simulation, clinicians are presented with Christina, a 45-year-old female who goes to her primary care physician for a regular annual check-up. The clinicians have the opportunity to explore her complaints of tiredness, depression, changes in her menstrual cycle, and weight gain. Throughout the simulation, the learners were required to make decisions that provided insight into the primary care clinician's experience, knowledge, competence, and performance in the assessment and diagnosis of SWD.

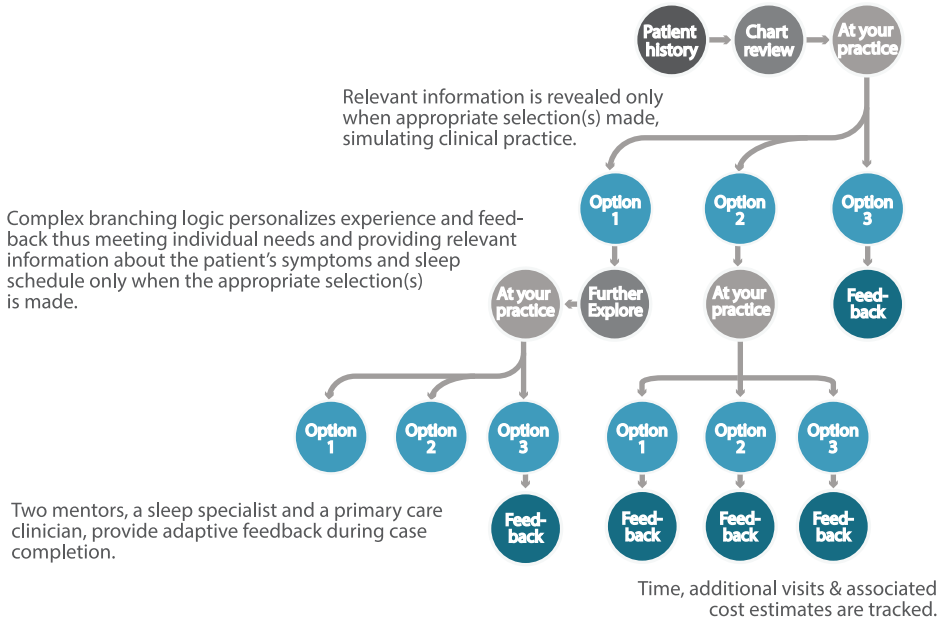
"We deliberately made this patient very ordinary," said Karen Roy MSc., CCMEP, Principal at Ardgillan Group, and co-author of the simulation. "She's a working mother who gets up at 3 a.m. to be at her bakery job by 4 a.m. This work schedule makes her an ideal candidate for a SWD diagnosis as this time period of the early morning shift worker represents the largest segment of shift work in the U.S. today."

As in a real clinical situation, relevant information was revealed only when appropriate selections were made in the simulation during the patient history and chart review phase.

"This simulation reflected real life practice. Most patients don't come in with a diagnosis, but rather say 'I am tired.' This is a symptom-based problem, so we should teach it that way. We often have to extract information from our patients," said Dr. Doghramji.

The simulation unfolds based on the each learner's choices. If the learner makes poor choices or misses a key decision, personalized feedback is provided to allow them to progress in the simulation. Drs. Doghramji and Drake, as mentors, guide the learners through practical ways to assess SWD in the primary care setting and provide adaptive feedback throughout the simulation.

"It was important to the education that learners were allowed to make decisions during the simulation and receive feedback if they missed something," said Drake. Added Dr. Doghramji, "There is nothing better than learning from your mistakes."



Schematic above is simplified for this case study

Educators gained valuable and actionable insights into the practice behavior of primary care clinicians

DecisionSim collects detailed information on each decision made by learners, the order in which they make the decisions and even the time it takes to make a decision. In this simulation, the data set included over 48,000 relevant decisions that were based on the clinical context provided in the simulation. From this data, the educators could identify the learners' decisions and their paths through the simulation.

Selected outcomes and clinical insights gained from the SWD DecisionSim simulation were presented at the annual meeting of the Associated Professional Sleep Societies and the abstract was published in a supplement to the medical journal SLEEP.

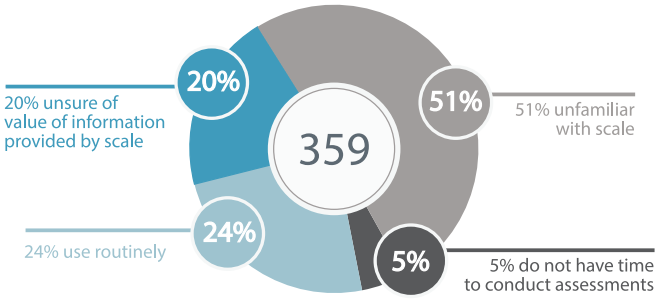
"There was great value in being able to get the volume and depth of insights to be able to submit an abstract to this medical meeting," said Roy. "Educators need to publish more widely on the outcomes and needs assessments discovered in their CME activities."

The educators were able to uncover new findings and confirm previous information through the data collected during the simulation, including:

SWD is Underdiagnosed in Primary Care.
A staggering 49 percent of the clinicians that used the simulation, which included physicians, nurses, physician assistants, and pharmacists, reported that they have never diagnosed any patient with SWD even though a growing percentage of their patients struggle with it.

Familiarity With Sleep Scales and Tools is Low.
The data also revealed that 51 percent of learners were unfamiliar with proven assessment tools such as the Epworth Sleepiness Scale. Interestingly, although 64 percent correctly chose sleep hygiene as a primary management strategy for Christina, either alone or in conjunction with medications, 25 percent of them reported that they were, in fact, unfamiliar with sleep hygiene principles.

Tiredness May Not be Explored as a Priority.
For a disorder of sleep timing, the authors discovered that in taking a sleep history, the questions relating specifically to the timing of sleep were least popular. Thirty-nine percent of participants omitted those questions prior to correction with adaptive mentor feedback.



"By using DecisionSim," continued Roy, "we were are able to offer an engaging and effective educational activity while tracking a clinician's level of involvement, providing a high degree of personalized feedback, and gaining significant, new findings. The faculty enjoyed building the simulation, the learners were very engaged and the outcomes provided unexpected insights."

1. McMenamin™, Holden RJ, Bahls D A time to work: recent trends in shift work and flexible schedules. Monthly Labor Rev 2007; 13-3
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5. Drake CL, Roehrs T, Richardson G, Walsh JK, Roth T. Shift work sleep disorder: prevalence and consequences

Decision Simulation

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Challenges in Diagnosis of Shift Work Disorder in Primary Care Practice

Practice Gaps Identified From an Online Patient Simulation

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Activty supported by Teva CNS
Poster created by infograph-ed™

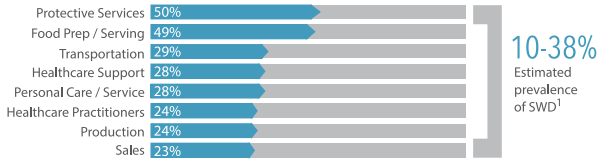
1. Introduction

Shift Work Disorder (SWD) is a circadian rhythm sleep disorder in which an individual's circadian rhythm and work/sleep schedule is misaligned.[1] Diagnosis is based on symptoms of excessive sleepiness and/or insomnia associated with the misaligned sleep schedule.[1] SWD could be identified in primary care practices, yet remains significantly underdiagnosed and is rarely addressed thus posing a significant public health problem.

ICSD-3 criteria.[1] Criteria A-D must be met.

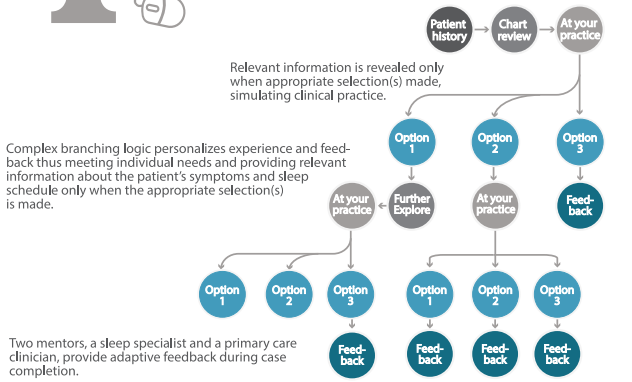
A	B	C	D
There is a report of insomnia and/or excessive sleepiness, accompanied by a reduction of total sleep time, which is associated with a recurring work schedule that overlaps the usual time for sleep.	The symptoms have been present and associated with the shiftwork schedule for at least three months.	Sleep log and actigraphy monitoring (whenever possible and preferably with concurrent light exposure measurement) for at least 14 days (work and free days) demonstrate a disturbed sleep and wake pattern.	The sleep and/or wake disturbance are not better explained by another current sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

Percentage of shift workers in selected industries[2]



2. Discovery Learning Design

A certified Continuing Medical Education (CME) program[3] incorporating an online patient simulation was developed to determine experience, knowledge, competence, and performance in assessment and diagnosis of SWD. Utilizing a novel simulation platform, the case was designed to particularly assess skills in taking a sleep history including relevant symptom assessment. The case was made available via an online medical education community for primary care clinicians.



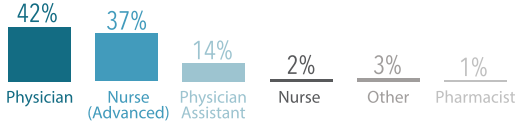
Time, additional visits & associated cost estimates are tracked.

Schematic above is simplified for presentation of this poster.

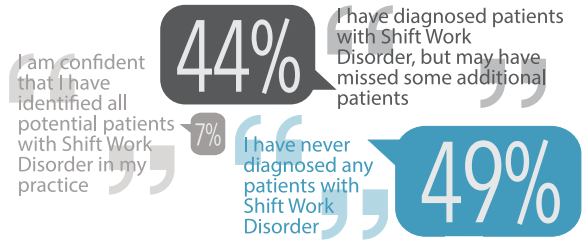
References: [1]American Academy of Sleep Medicine (AASM) International Classification of Sleep Disorders Diagnostic Manual, Third Edition, 2014; [2]McMenamin TM et al Monthly Labor Rev. 2007;130:9-11; [3]http://www.pri-med.com/PMO/Activity.aspx?activity=222015 Accessed May 28, 2014.

3. Primary Care Participants

1,941 primary care participants started the activity.

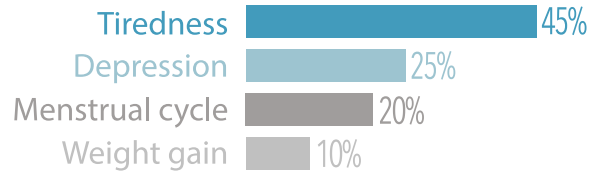


4. SWD is Underdiagnosed in Primary Care

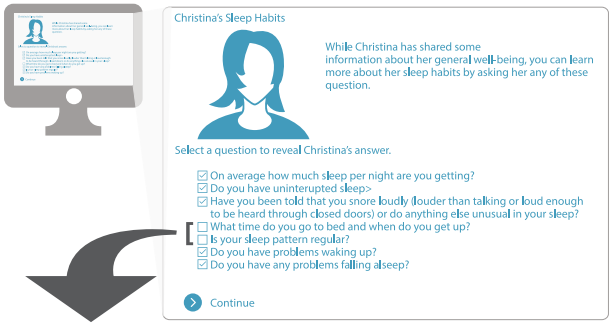


5. Tiredness May Not be Explored as Priority

The patient (Christina, aged 45) presented with a primary initial complaint of tiredness and expressed concern about weight gain and irritability and wondered if she was peri-menopausal. Clinicians' first thoughts in exploring her complaint...



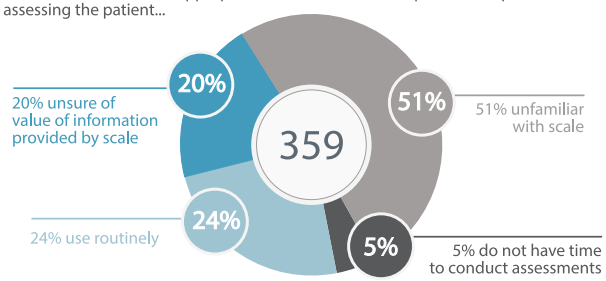
6. Timing of Sleep Least Likely to be Explored



39% In taking a sleep history, questions relating to timing of sleep were least popular with 39% of participants omitting those questions prior to correction with adaptive mentor feedback.

7. Familiarity With Sleep Scales & Tools is Low

Of those who made the appropriate decision to use the Epworth Sleepiness Scale in assessing the patient...



64% chose sleep hygiene as primary option (alone or in combination with medications) but...

26% Unfamiliar with sleep hygiene principles

31% Not confident that sleep hygiene improves sleep disorders

8. Diagnosis of SWD May be Delayed

61% who received corrective feedback incurred unnecessary additional patient visits, thus delaying appropriate diagnosis and increasing costs.

9. Simulation Engages Learners

48,045 total decisions recorded » 35 per learner

10. Conclusion

These findings suggest that despite a high prevalence in primary care, there is a lack of understanding of basic sleep assessments and management of SWD. Providing standard assessments and resources with education programs without assessing learners' competence in their use may limit the positive impact on patient care.