Prevention of Delirium in Dementia

Appropriate Use of Antipsychotics Project

Seniors Health Strategic Clinical Network (SCN)

In collaboration with Addiction & Mental Health SCN

Alberta Health Services

The AUA project is an initiative of the Seniors Health Strategic Clinical Network
SCNs re-shape health care:

- Focus on what Albertans need
- Use scientific evidence to guide care decisions
- Support good care approaches across the province

In collaboration with: Front-line physicians and clinicians, zone/clinical leaders, researchers, content experts, public, families, patients

Team Introductions

- **Introduce your team/family member**
  - Names and roles
- **Provide a quick overview**
  - Current antipsychotic use
  - Successes/Stories: Supporting Sleep
  - Challenges
  - Why is delirium a topic of interest for you?
  - What do you hope to learn about delirium?

Confidentiality reminder

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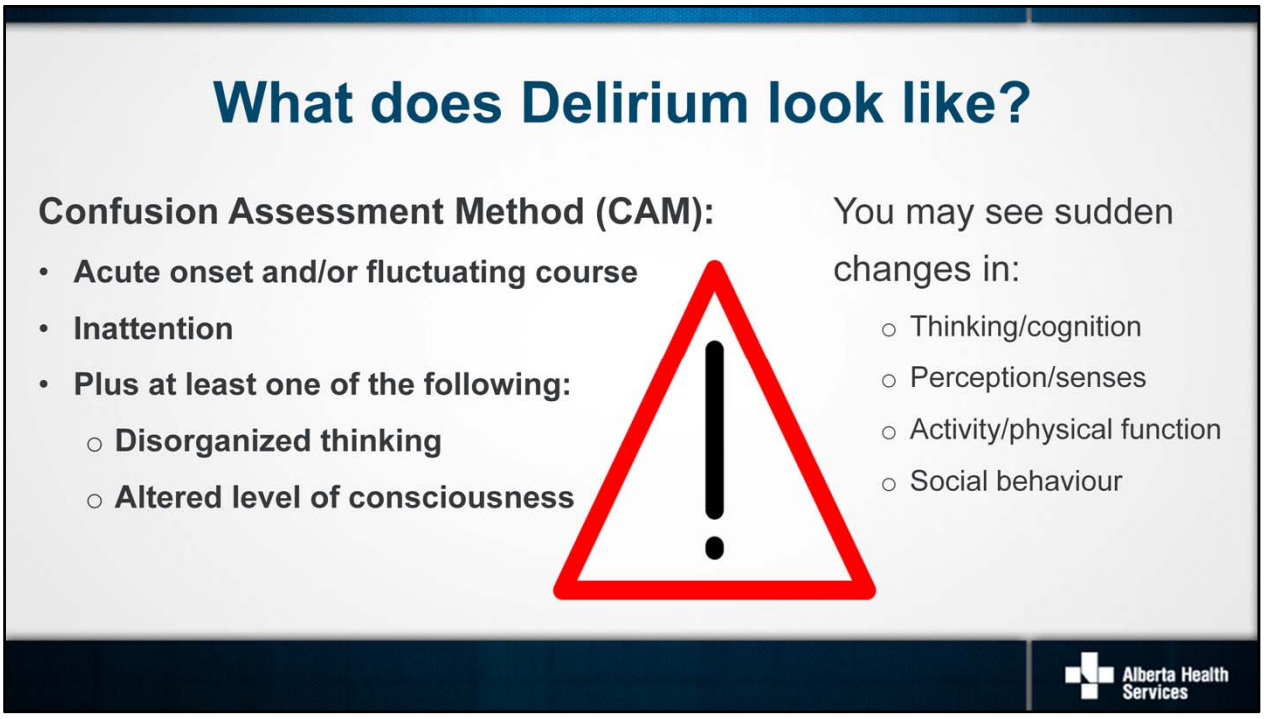
Highlight successes – make sure each team member feels heard by providing a summary statement to the group

Any successes with improving sleep after the fall workshops? What was tried? What worked or didn't work?

Confidentiality reminder: we have a resident/client/patient/woman/man… avoid use of names or identifying information.



Many times when antipsychotics are discontinued, people are okay for a while, then there's a sudden change or increase in behaviours, and the antipsychotic is restarted or increased – but the sudden change could signal a delirium.
What is delirium? Warning signs of underlying physical or psychological stress that are too much for the mind and body to handle.

Assessing for delirium: sometimes we're confused about the confusion assessment method. **Signs of delirium are often missed:**

- Sudden onset of confusion may be mistaken for normal or worsening dementia
- Confusion that is worse in the evenings may be accepted as "normal sundowning"
- Inattention may be difficult to perceive with limited verbal communication
- Increased activity/agitation may be mistaken for worsening responsive behaviours
- Altered level of consciousness – drowsy, difficult to wake up - may be common due to sedative use or be mistaken for depression

Examples of what delirium might look like:
1. Cognitive (e.g. worsened concentration, slower responses, more confused, don't recognize people they usually recognize, more trouble paying attention, response may fluctuate over the day – e.g. worse in the evening;
2. Perception (e.g. visual or auditory hallucinations/See or hear things)
3. Physical function: less movement or mobility, sleeping more, not hungry – or more restless, agitated, sleeping less
4. Social behaviour (e.g. reduced co-operation with care, withdrawal, or changes in mood and/or attitude (NICE 2010)

References:
Kiely, D. K., Jones, R. N., Bergmann, M. A., & Marcantonio, E. R. (2007). Association between psychomotor activity delirium subtypes and mortality among newly admitted postacute facility patients. Journals of Gerontology - Series A Biological Sciences and Medical Sciences, 62(2), 174-179. NICE 2010 http://www.nice.org.uk/guidance/cg103/evidence/full-guideline-134653069

What Causes Delirium?

Causes of Delirium:

- THINK
- ICUDELIRIUMS
- IWATCHDEATH(E)
- BURPEDME

Roughly 94 possible causes included in the above acronyms

Nearly everything but the – kitchen sink!

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There are so many possible causes of delirium, that various acronyms have been employed to help keep track of all the possibilities:
Toxins, shock, infection, immobility, metabolic problems, diagnostic procedures, surgery, use of restraints and catheters, pain, constipation – everything but the kitchen sink!

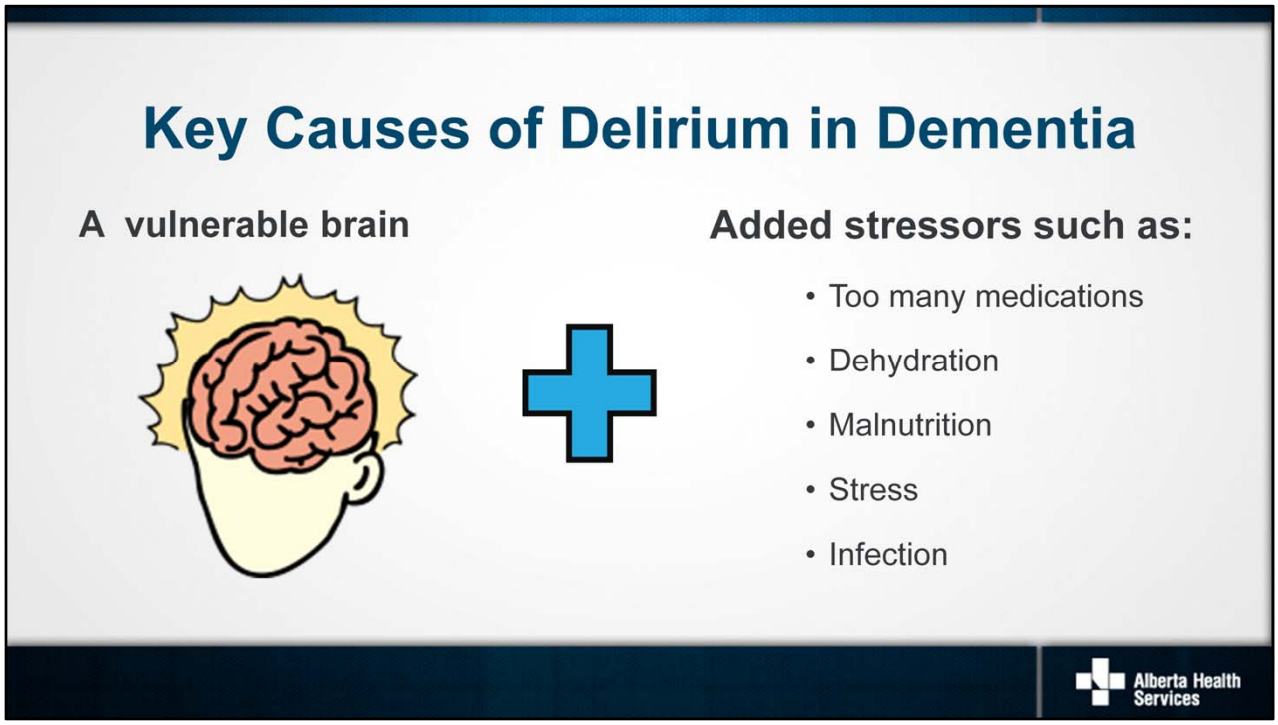
There are almost 100 possible causes included in these acronyms. Education focused on a thorough list of all the possibilities can be overwhelming. Where do we start?

Fortunately, curious people have continued to explore the underlying causes of delirium – there is plenty of fresh and interesting research available.
There are patterns that can be identified.
And there are some causes that are less important in continuing care – where you won't be performing surgeries, for example.

Our hope today is to simplify delirium for you – and to focus on some proactive strategies that will not only reduce the incidence of delirium, but improve quality of life for residents and save care teams time and effort!

References:

Laurila, J. V., Laakkonen, M. , Laurila, J. V., Timo, S. E., & Reijo, T. S. (2008). Predisposing and precipitating factors for delirium in a frail geriatric population. Journal of Psychosomatic Research, 65(3), 249-254.
Inouye SK. Prevention of delirium in hospitalized older patients: Risk factors and targeted intervention strategies. Ann Med. 2000;32(4):257-263. Significant precipitating factors were identified, including physical restraint use, malnutrition, adding more than three drugs, bladder catheter use, and any iatrogenic event.



What causes Delirium in a continuing care population, especially those with dementia? A vulnerable brain + a precipitating factor

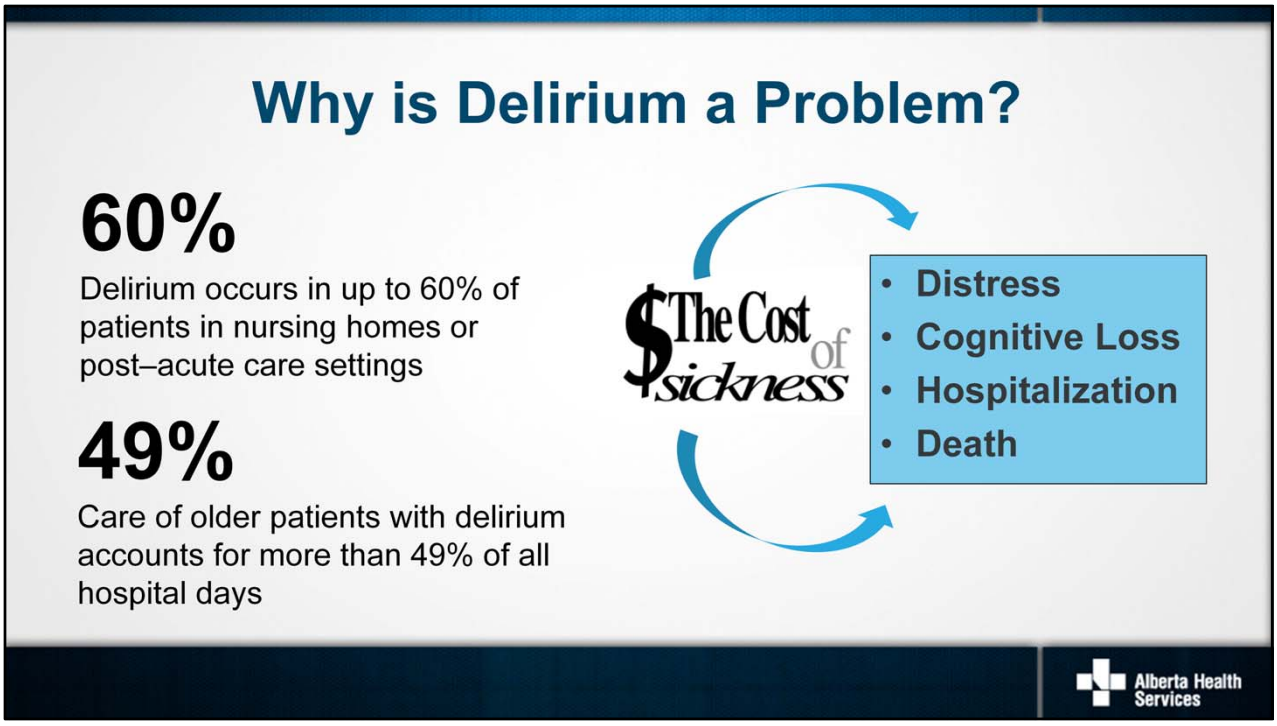
What makes someone vulnerable?
dementia or depression,
frailty, functional dependence, immobility
coexisting medical conditions and illnesses,
problems with hearing, vision

If the patient is *very* vulnerable, ONE dose of a benzodiazepine or antipsychotic can cause delirium
If less vulnerable, delirium may develop only after exposure to multiple insults (e.g. too many medications, dehydration, sleep deprivation, infection, stress). All of the causes need to be addressed to resolve the delirium.

Our focus in this workshop is not on 94 possible factors, but 5 basics. If we pay attention to these 5 things, we can prevent delirium more often.

References:

Laurila, J. V., Laakkonen, M., Timo, S. E., & Reijo, T. S. (2008). Predisposing and precipitating factors for delirium in a frail geriatric population. Journal of Psychosomatic Research, 65(3), 249-254.
Ahmed S, Leurent B, Sampson EL. Risk factors for incident delirium among older people in acute hospital medical units: A systematic review and meta-analysis. Age Ageing. 2014;43(3):326-333
The commonest factors significantly associated with delirium were dementia, older age, co-morbid illness, severity of medical illness, infection, 'high-risk' medication use, diminished activities of daily living, immobility, sensory impairment, urinary catheterisation, urea and electrolyte imbalance and malnutrition.



Delirium is common: occurs in up to 60 percent of patients in nursing homes or post–acute care settings and in up to 83 percent of all patients at the end of life.

Cost to the resident: loss of cognition may be irreversible, distress (agitation, psychosis), hospitalization, death

- 6 month outcomes of co-occurring dementia, delirium and depression in LTC: By 6 months, 10% of 274 had died, 19% of 233 had experienced functional decline, and 17% of 246 had experienced cognitive decline. (McCusker 2014)
- Approximately 1 in 8 hospitalized patients with Alzheimers Disease who develop delirium will have at least 1 adverse outcome, including death, institutionalization, or cognitive decline (Fong 2012)

Cost to the taxpayer/health care system:

- Care of older patients with delirium accounts for more than 49 percent of all hospital days. (Inouye 2006)
- Delirium complicates hospital stays for at least 20 percent of patients 65 years of age or older who are hospitalized each year and increases hospital costs by $2,500 per patient (Inouye 2006)
- Total cost estimates attributable to delirium ranged from $16 303 to $64 421 per patient (Leslie 2008)

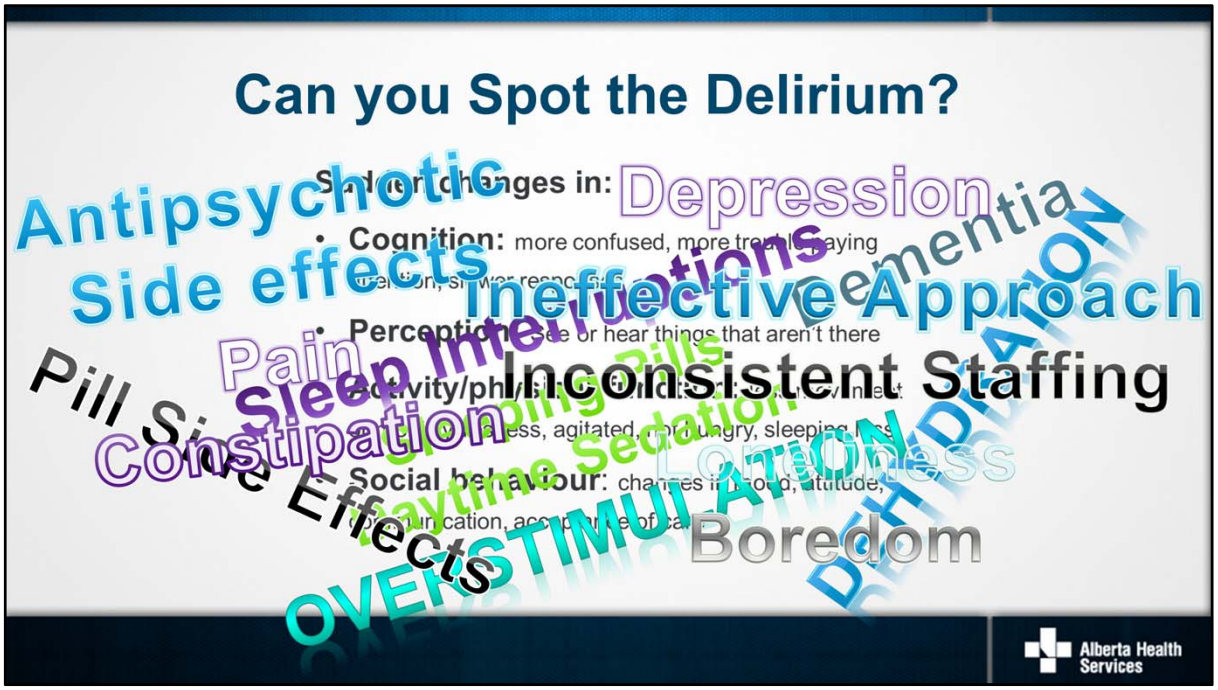
References

Sharon K. Inouye, M.D., M.P.H. Delirium in Older Persons. N Engl J Med 2006;354:1157-1165

Leslie, D. L., Marcantonio, E. R., Zhang, Y., Leo-Summers, L., & Inouye, S. K. (2008). One-year health care costs associated with delirium in the elderly population. Archives of Internal Medicine, 168(1), 27-32.

Fong TG, Jones RN, Marcantonio ER, et al. Adverse outcomes after hospitalization and delirium in persons with alzheimer disease. Ann Intern Med. 2012;156(12):848-856.

McCusker J, Cole MG, Voyer P, et al. Six-month outcomes of co-occurring delirium, depression, and dementia in long-term care. J Am Geriatr Soc. 2014;62(12):2296-2302.



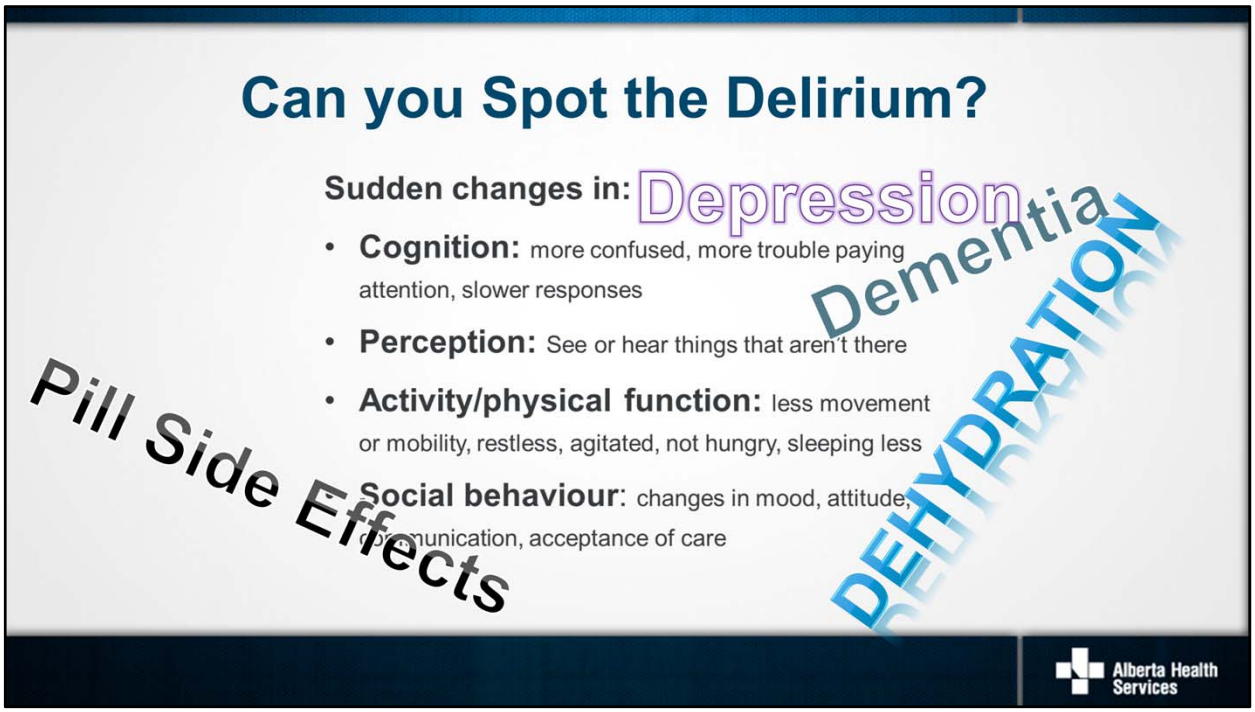
Historically, delirium education has been a little overwhelming, because it has been aimed at nurses working in chaotic environments – with little to no control over the chaos.

We look for more confusion and agitation in people receiving drugs with side-effects of confusion and agitation.
We attempt to notice more sedation or sleep disruptions in people who nap all day and are wakened at night for routine continence care or repositioning

A study by Voyer (2008) showed despite a high prevalence of delirium in [LTC]… (71.5%), nurses were able to detect the delirium in only a minority of cases (13%)

References

Voyer, P., Richard, S., Doucet, L., Danjou, C., & Carmichael, P. -. (2008). Detection of delirium by nurses among long-term care residents with dementia. BMC Nursing, 7



But, we're getting organized.

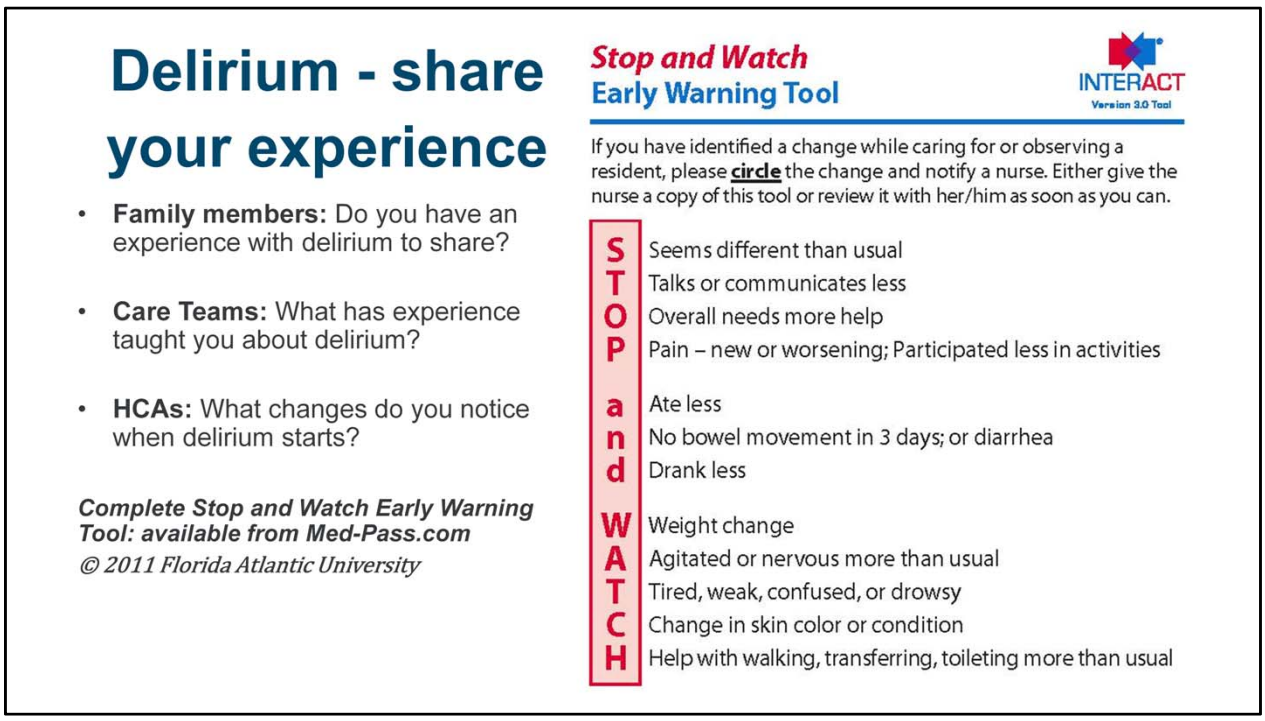
In 2014/15, Alberta long term care teams began to use fewer antipsychotics.

- Residents woke up. They were able to have conversations with family and staff again. They were happier and easier to care for.
- Underlying needs such as pain and constipation were identified. Ground flax was added to oatmeal. Thorough pain assessments and scheduled pain medication was considered.
- Staff worked to provide a more consistent, person-centred approach for each resident.
- Care teams made resident days more interesting with meaningful activities.
- Residents became more capable of connecting with staff, families, volunteers and other residents, which decreased loneliness and social isolation.

In fall of 2015, the AUA project team introduced ways to support sleep in dementia, and explained how long term use of sleeping pills actually makes sleep worse.

- Care teams began to reduce their use of sleeping pills
- Overuse of call bells, bed alarms and overhead paging was considered, because of the impact on cortisol levels, sleep and responsive behaviours.
- Care teams took steps to provide more daytime light and activity, more night time darkness and quiet.
- They limited nap times and kept residents occupied later in the evenings so sleep could happen at night instead of during the day.

In this workshop, we'll introduce you to some additional actions to reduce chaos and the occurrence of delirium.



Care aides, recreation therapists and families are often the first to notice that "something is off". The Stop and Watch Tool is an early warning tool designed for care staff. By circling and sharing the observations on this form, a discussion is initiated regarding observed changes, with the nurse and/or care team.

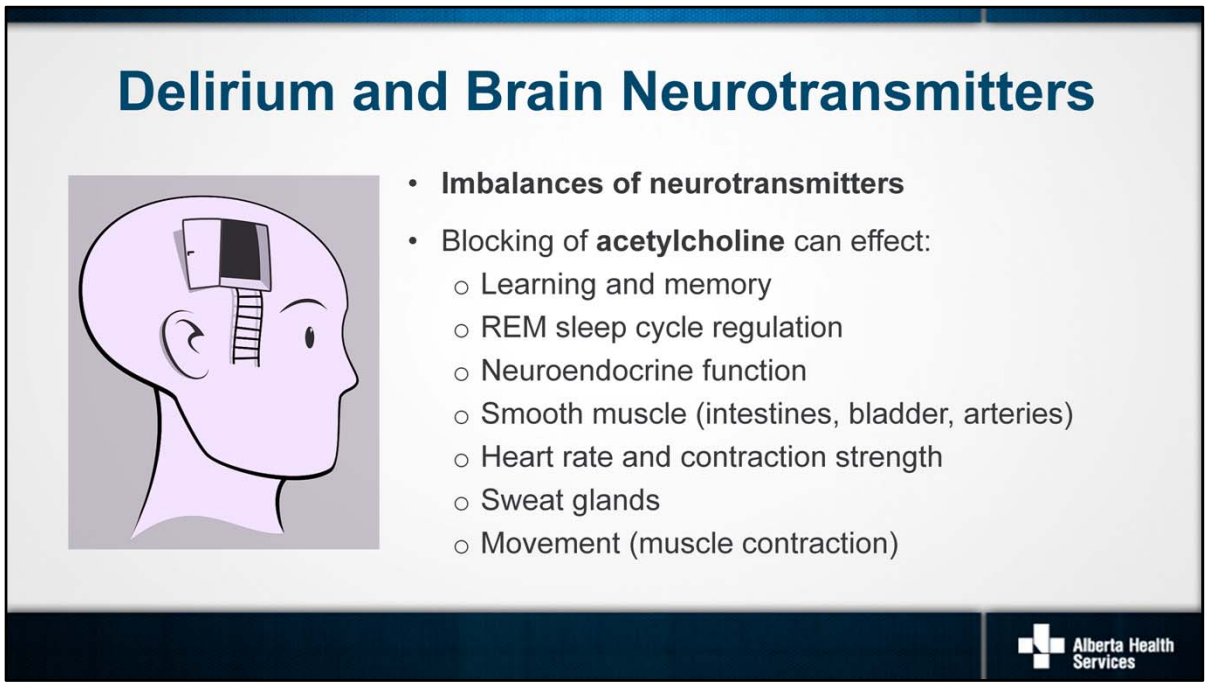
S - Seems different than usual
T - Talks or communicates less
O - Overall needs more help
P - Pain – new or worsening; Participated less in activities

A - Ate less
N - No bowel movement in 3 days; or diarrhea
D - Drank less

W - Weight change
A - Agitated or nervous more than usual
T - Tired, weak, confused, or drowsy
C - Change in skin color or condition
H - Help with walking, transferring, toileting more than usual

Feedback from Lethbridge Alberta Covenant Health Supportive Living site (St. Therese Villa):

- Consistently effective in identifying issues early; increased communication and decreased ER admissions
- Once people became comfortable with it, they passed on information without the tool, but still passed on the same info
- The majority of experienced staff were already informally passing this information on, but it was still helpful in clarifying what to communicate with each other, especially with inexperience/new staff.
- Helped the HCAs to feel heard
- Education support: standing agenda at staff meetings



Delirium is something serious happening in the brain. This is why we see confusion, difficulty paying attention and increased agitation and/or drowsiness.

Delirium can be caused by imbalances in neurotransmitters such as Dopamine, Serotonin, Melatonin, Cortisol, Norepinephrine, Glutamate, GABA.

If you attended sleep education we introduced in fall of 2015, you'll recognize the names of some of these neurotransmitters. Adequate sleep and melatonin is important for delirium prevention.

Low acetylcholine can cause delirium. This is the neurotransmitter we'll focus on today.

References:

Maldonado JR. Neuropathogenesis of delirium: Review of current etiologic theories and common pathways. The American Journal of Geriatric Psychiatry. Dec 2013;21(12):1190-1222.

Acetylcholine and Delirium

- Acetylcholine “powers up” activity in the brain, bowel, bladder, heart, muscles, lungs, etc.
- Acetylcholine levels are already lower in older adults (90% lower in Alzheimer's)
- Stress causes increased demand for acetylcholine
- Many medications block the actions of acetylcholine

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This is a photo of what power lines look like in Kathmandu, Nepal. If you want electricity, you get a brave person to stick their hand into the nest of wires and connect you to the grid. You can imagine that they don’t have as many wind turbines and hydroelectric dams as Canada. The demand for power is much greater than the supply. Power in Katmandu is sporadic.

Acetylcholine “powers up” a lot of what goes on in the brain and body.

Acetylcholine levels are already lower due to advanced age – or minimal due to Alzheimer's disease.

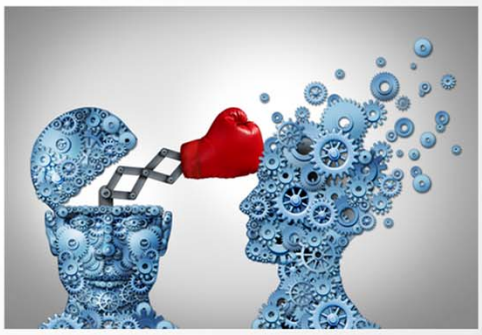
Increased stress easily overloads the system.

In addition, there are many medications that reduce acetylcholine levels.

References:
https://web.williams.edu/imput/synapse/pages/IA1.htm

Anticholinergic Cognitive Burden (ACB)

Medication	ACB
Metoprolol (Lopressor) 100 mg ER daily	1
Captopril (Capoten) 50 mg TID	1
Furosemide (Lasix) 40 mg daily	1
Trazodone (Desyrel) 50 mg hs	1
Paroxetine(Paxil) 20 mg daily	3
Oxybutynin (Ditropan ER) 10 mg	3
Diphenhydramine (Benadryl) 25 mg QID	3
Quetiapine (Seroquel) 25 mg TID	3
Alprazolam (Xanax) 0.5 mg TID	1
Anticholinergic cognitive burden	**17**



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Some anticholinergic resources indicate medications that are high or low. A resource from Population Health Management gives 1,2 or 3 points for how strongly drugs block the action of acetylcholine and suggests a drop in the mini-mental score of a third of a point every 2 years, for every point increase in the Anticholinergic Cognitive Burden total score. The more of these medications, the less acetylcholine is available to "power up" the brain and body
This particular list has the potential to drop a mini-mental score from 30 to 13 in just 6 years – and a score of 12 indicates severe dementia.

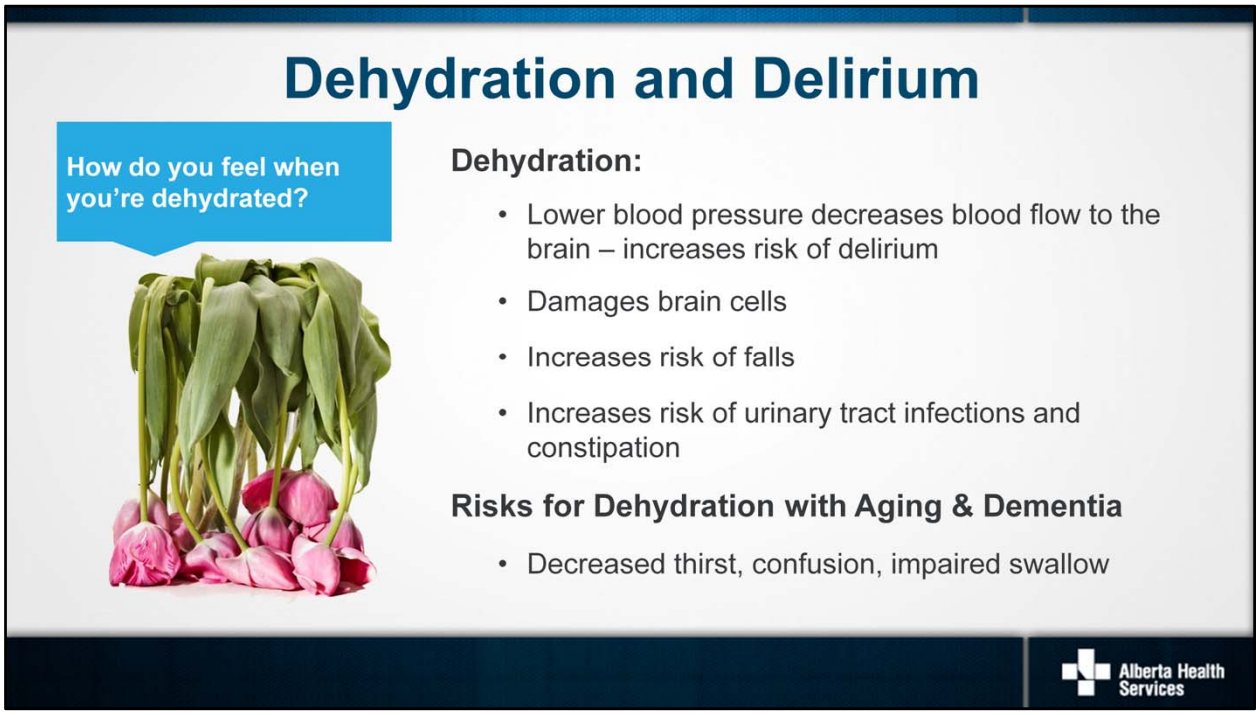
Can't just stop all anticholinergic medications– must weigh risks/benefits

Pay attention to prescribing cascades:

- **Antipsychotics** can cause agitation, confusion and interfere with sleep – which can result in sedatives
- **Memory drugs (e.g. Aricept)** increase acetylcholine, but cognition is influenced by many factors. Side effects of these drugs include loss of bladder control, which may be counteracted with medications such as Ditropan; or behavioural disturbances which may result in use of antipsychotics – both highly anticholinergic.
- **Statins** have side-effects of muscle pain and weakness – which may result in agitation, aggression and calling out – and antipsychotics. Statins also reduce Co-Enzyme Q10(essential for cardiac function) and interfere with essential fatty acid metabolism (may result in atrial fibrillation). This may result in diuretics and beta blockers – which increase anticholinergic burden.

References:

Beatrice A. Golomb, M.D., Ph.D. and Marcella A. Evans, B.S. Statin Adverse Effects: A Review of the Literature and Evidence fhttp://www.thennt.com/nnt/statins-for-heart-disease-prevention-without-prior-heart-disease/
Ghirlanda G, Oradei A, Manto A, Lippa S, Uccioli L, Caputo S, Greco AV, Littarru GP. Evidence of plasma CoQ19-lowering by HMG-CoA reductase inhibitors: a double-blind, placebo-controlled study. J Clin PHarmacol. 1993 Mar; 33(3):226-9.
Deichmann R, Lavie C, Andrews S. Coenzyme q10 and statin-induced mitochondrial dysfunction. Oschner J. 2010 Spring;10(1):16-21.



Did you know mental performance deteriorates even in mildly dehydrated younger adults? If you've only had coffee so far today, you may not be thinking at your best! Get up and pour yourself a drink of water!

In those with cognitive impairment / dementia:

- Blood pressure decreases with dehydration, which decreases brain perfusion, which causes confusion
- This also increases risk of falls (Wimmer 2014)
- Severe dehydration can damage the mitochondria – the energy producing parts of the brain cells.
- Dehydration can increase the risk of urinary tract infections, another cause of delirium.

There are risks for dehydration that come with aging and dementia: decreased thirst, stroke, inattention (may not sit and complete a full serving of fluids), swallowing difficulties

Interesting end of life delirium info: Davies et al found that limited hydration (e.g. 1 litre/day for 2 days by hypodermoclysis) can help to prevent end of life delirium.

References:

Wilson, MMG and Morley JE. Impaired cognitive function and mental performance in mild dehydration

Wimmer, Barbara C; Dent, Elsa; Bell, J Simon; more… Medication Regimen Complexity and Unplanned Hospital Readmissions in Older People. Annals of Pharmacotherapy, 09/2014, Volume 48, Issue 9

Davies A, Waghorn M, Boyle, J, Gallagher A, and Johnsen S. Alternative forms of hydration in patients with cancer in the last days of life: study protocol for a randomised controlled trial. Trials Journal 2015 Oct 14. http://www.trialsjournal.com/content/16/1/464

Singler K, Hafner M, Sieber C. Delirium is a very common and life-threatening condition. Ther Umsch 2010 Feb; Vol 67 (2) pp.63-7

Lorenzl S, Fusgen I, Noachtar S. Acute confusional states in the elderly--diagnosis and treatment. Dtsch Arztebl int. 2012;109(21):391-399.

Dementia, dehydration and polypharmacy are particularly strongly associated, in the elderly (Lorenzl 2012)

Sedatives /sleeping pills can leave a person too sleepy to drink enough fluids

Diuretics directly increase excretion of water and electrolytes – and dehydration can injure the kidneys.
Of interest: Withdrawal of diuretics was maintained in 51-100% of subjects and was unsuccessful primarily when heart failure was present. Adverse effects from medication withdrawal were infrequently encountered. (Hubbard 2013)

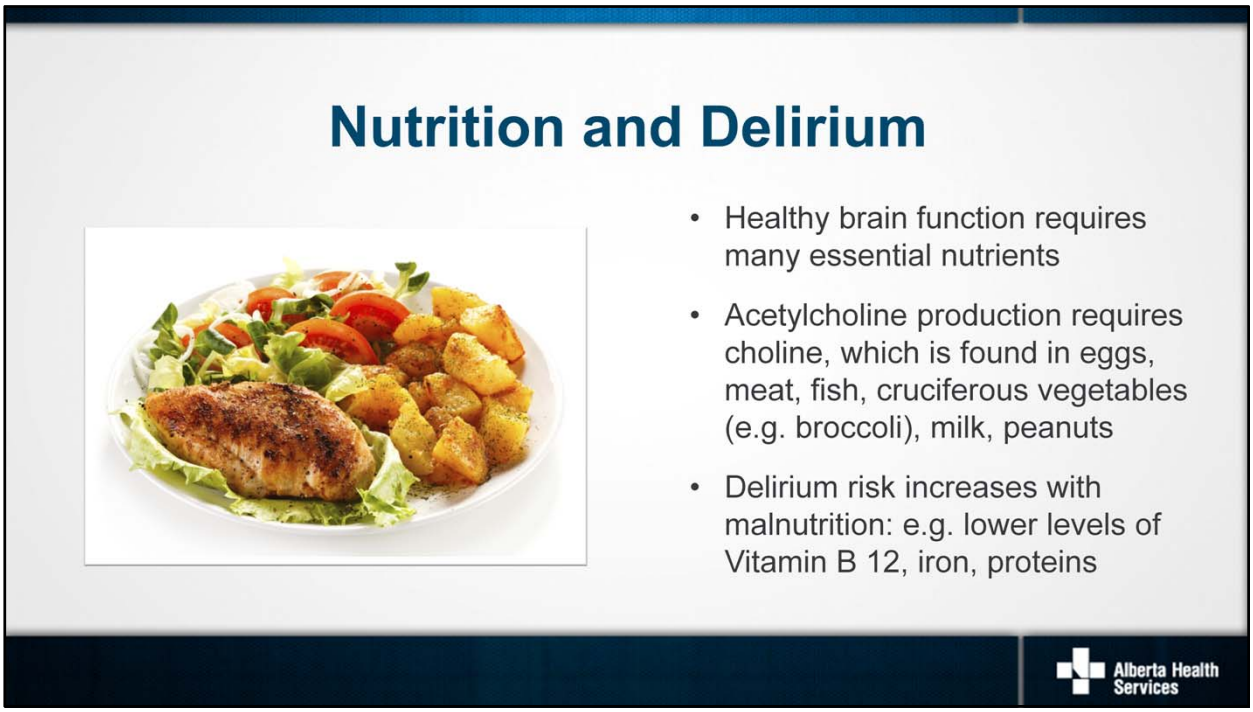
Laxatives: Prolonged constipation often results in laxative administration. What happens after repeated doses? Diarrhea, dehydration and often, hospital admission**.** Hydration and fiber, and reduction of anticholinergic burden.

Acid-blocking drugs such as Proton Pump Inhibitors alter the pH of the bowel, impair absorption of key minerals, vitamins and electrolytes and are associated with an increased risk of Clostridium Difficile diarrhea (C-Diff).

Bisphosphonates (to increase bone density) must be taken sitting up with a full glass of water. Not only does this usually involve waking a sleeping resident, groggy residents are not likely to drink the full glass of water required. A pill lodged in the esophagus can cause erosion and swelling.

References:

Diuretics and the acute risk of falls in the nursing home/Diuretics increase morbidity in elderly patients. Annual Scientific Meeting of the American Geriatrics Society (2011) : 11 May 2011.
Alyer, Shoba; Naganathan, Vasi; McLachlan, Andrew J; more... Medication Withdrawal Trials in People Aged 65 Years and Older: A Systematic Review. Drugs & Aging, 2008
Hubbard, Ruth E; O'Mahony, M Sinead; Woodhouse, Kenneth W. Medication prescribing in frail older people. European Journal of Clinical Pharmacology, 03/2013, Volume 69, Issue 3



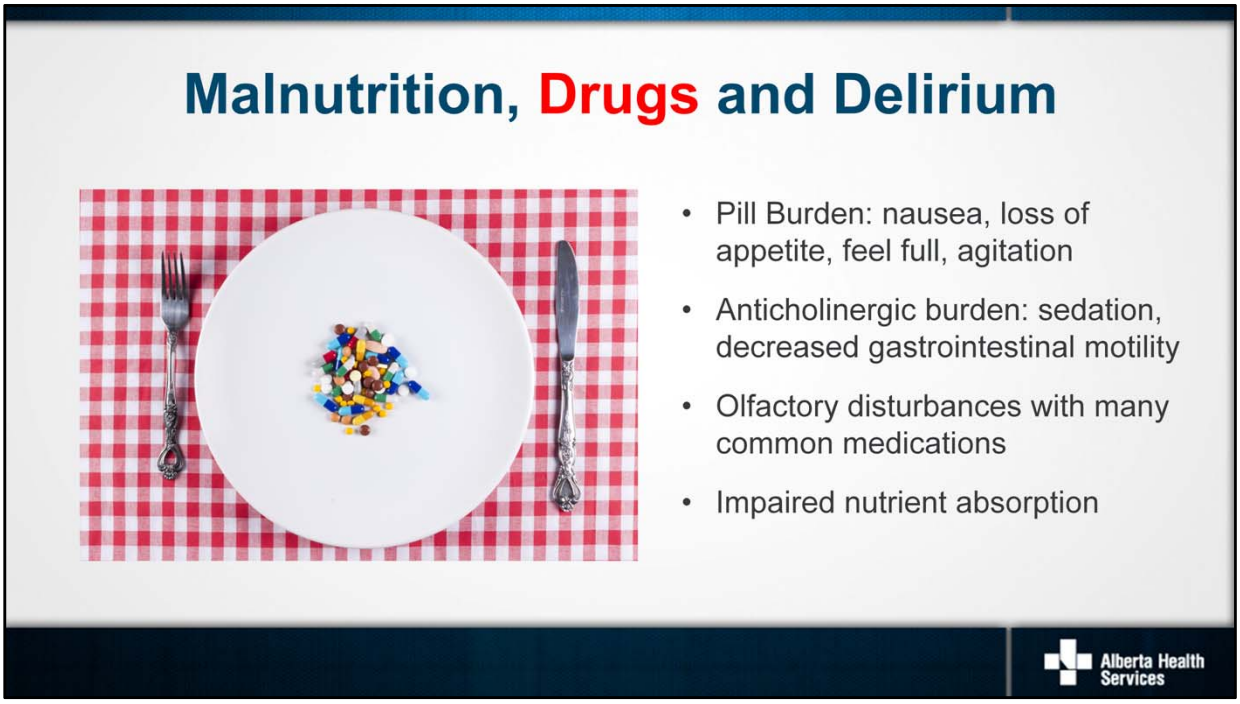
Malnutrition / nutrient deficiencies put people at risk of developing delirium

- Choline is required for the cell mitochondria to manufacture acetylcholine – choline is found in eggs, meat, fish, cruciferous vegetables (broccoli), milk and peanuts.

- Malnutrition has been correlated with delirium risk and/or severity, as measured by:
    - Pre-operative cobalamin (B12) levels (Sevuk 2015)
    - Low iron - Hemoglobin less than 12 (Foroughan 2015, Chen 2015)
    - Alterations in amino acids (lower plasma tryptophan and tyrosine) (Pandharipande 2008, Robinson 2008)
    - Low albumin (Adamis 2007)

References:

Kenkmann, Andrea; Price, Gill M; Bolton, Joanne; more... Intake of Medication and Vitamin Status in the Elderly
BMC geriatrics, 2010, Volume 10, Issue 1
independent risk factors for delirium in critically ill patients. Intensive Care Medicine, 1-7.
Robinson, T. N., Raeburn, C. D., Angles, E. M., & Moss, M. (2008). Low tryptophan levels are associated with postoperative delirium in the elderly. American Journal of Surgery, 196(5), 670-674.
Adamis, D., Treloar, A., Darwiche, F. -., Gregson, N., Macdonald, A. J. D., & Martin, F. C. (2007). Associations of delirium with in-hospital and in 6-months mortality in elderly medical inpatients. Age and Ageing, 36(6), 644-649.
Sevuk U1, Baysal E2, Ay N3, Altas Y2, Altindag R2, Yaylak B2, Alp V3, Demirtas E. Relationship between cobalamin deficiency and delirium in elderly patients undergoing cardiac surgery. 9. Neuropsychiatr Dis Treat. 2015 Aug 7;11:2033-9
Foroughan M, Delbari A, Said SE, AkbariKamrani AA, Rashedi V, Zandi T. Risk factors and clinical aspects of delirium in elderly hospitalized patients in Iran. Aging Clin Exp Res. 2015 Jul 21
Chen YL1, Lin HC2, Lin KH3, Lin LS3, Hsieh CE3, Ko CJ3, Hung YJ3, Lin PY. Low hemoglobin level is associated with the development of delirium after hepatectomy for hepatocellular carcinoma patients. PLoS One. 2015 Mar 13;10(3)



Think about a typical morning in LTC. Elsie has just sat down to a hot breakfast when her 11 pills arrive, crushed in applesauce. By the time she coughs and sputters her way through bitter, crunchy applesauce and 120 mls of orange juice:

- Her blood sugar is up (that's close to 20 grams of sugar)
- She feels full and her stomach is upset (she vomits 20 minutes later)
- Her appetite is gone (lingering bitter aftertaste)
- Her breakfast is cold and she's agitated and frustrated

Daily intake of ≥3 drugs interferes with important vitamins such as D, K, B and folate (Kenkmann 2010) How can this be explained?

1. **Pill burden:** Nausea, loss of appetite
2. **Anticholinergic burden:** decreased GI motility, sedation

3. Sense of smell disturbances: ACE inhibitors, Beta blockers, Calcium-channel blockers, corticosteroids, gemfibrozil, levodopa, methotrexate

4. Many drugs that interfere with nutrient absorption: For example:

- Acid-blocking drugs: Stomach acid required to absorb e.g. iron, magnesium, calcium, zinc, B vitamins, proteins – e.g. tryptophan, tyrosine. National campaign now to decrease inappropriate use of Proton Pump Inhibitors (e.g. Pantoprazole)

- Statins: Cholesterol required to absorb fat-soluble vitamins such as A, E and D.

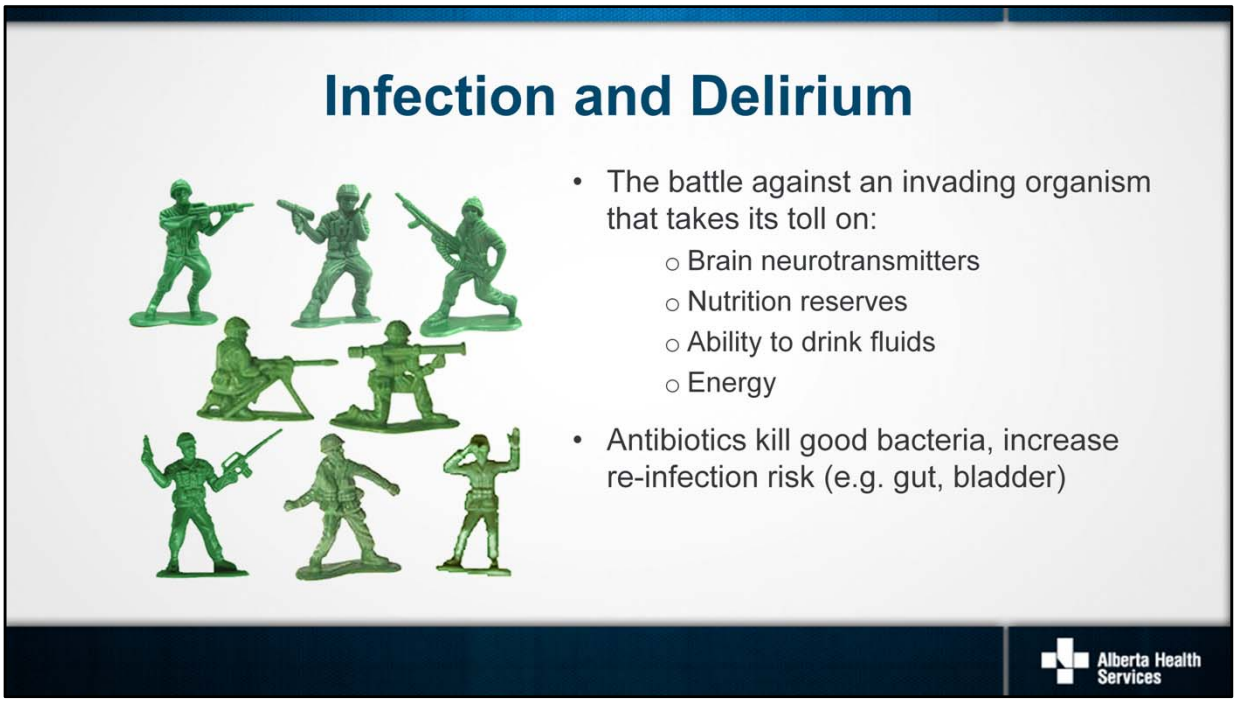
Metformin: Decrease in B12, folic acid

Antibiotics: destroy the "good bacteria" in the gut that play a role in digestion and absorption of vitamins and minerals (e.g. Vitamin K)

Diuretics: Drain the body of water-soluble nutrients (B vitamins, magnesium, potassium, sodium, calcium, zinc, Vitamin C)

References:

A practical guide to avoiding Drug-Induced Nutrient Depletion
http://nutritionreview.org/2013/04/practical-guide-avoiding-drug-induced-nutrient-depletion/
Kenkmann, Andrea; Price, Gill M; Bolton, Joanne; more... Intake of Medication and Vitamin Status in the Elderly. BMC geriatrics, 2010, Volume 10, Issue 1
https://www.merckmanuals.com/professional/nutritional-disorders/nutrition,-c-,-general-considerations/nutrient-drug-interactions



Infection is tough on even the young and strong. The body is under attack, and mobilizes resources to fight off the invading organisms.

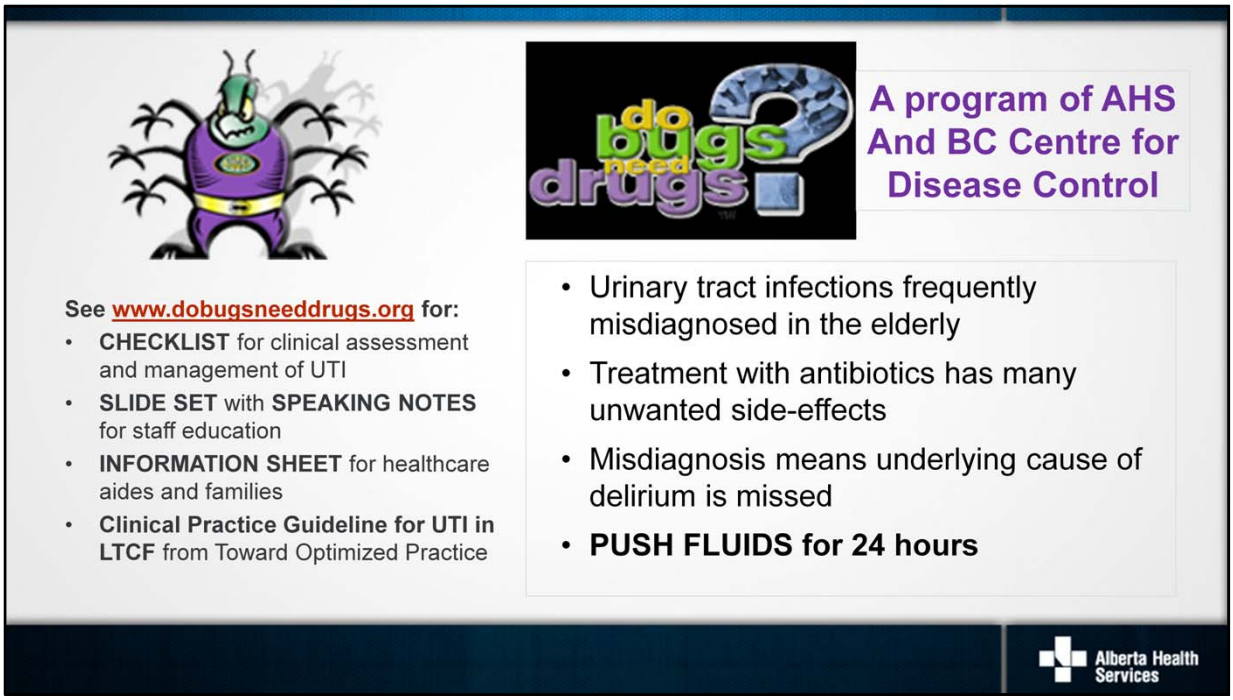
Infection results in the release of cytokines, chemical messengers released by the immune system. Cytokines send signals to other cells, triggering responses such as fever, inflammation and pain. This release of cytokines can lead to an imbalance among the different neurotransmitters (Singler 2010)

Ordinarily, this is protective. When you're sick, your brain signals you to slow down – which is one reason you feel apathetic and lazy. It's not the day you feel like washing windows or purging the basement. The brain and body are working together to focus energy on fighting infection. But for someone with dementia, an infection can be overwhelming.

Things that can increase risk of infection:
- Poor nutritional status – which can be worsened by excessive medications
- Inappropriate antibiotic treatment - increased risk of re-infection, C-diff diarrhea, and decreased ability to absorb nutrients
- Dehydration

References:

Singler K, Hafner M, Sieber C. Delirium is a very common and life-threatening condition. Ther Umsch 2010 Feb; Vol 67 (2) pp.63-7



In the past, it was believed that delirium was most commonly caused by infection, especially urinary tract infections.
Acute confusion, disorganized thinking, new or increased verbal or physical aggression, disorientation – prompted a urine dip, which inevitably led to a false positive and a diagnosis of urosepsis.
But these common symptoms of encroaching delirium are not in the criteria for UTI in long term care facilities.

UTIs are frequently misdiagnosed in the elderly
At age 80 more than 50% of women and more than 30% of men have bacteria in urine

- Bacteria, Pus and white blood cells in the urine is common in the elderly
- Foul smell is not an indicator of UTI
- Abnormal color is not suggestive of UTI
- Gross hematuria is usually not caused by a UTI

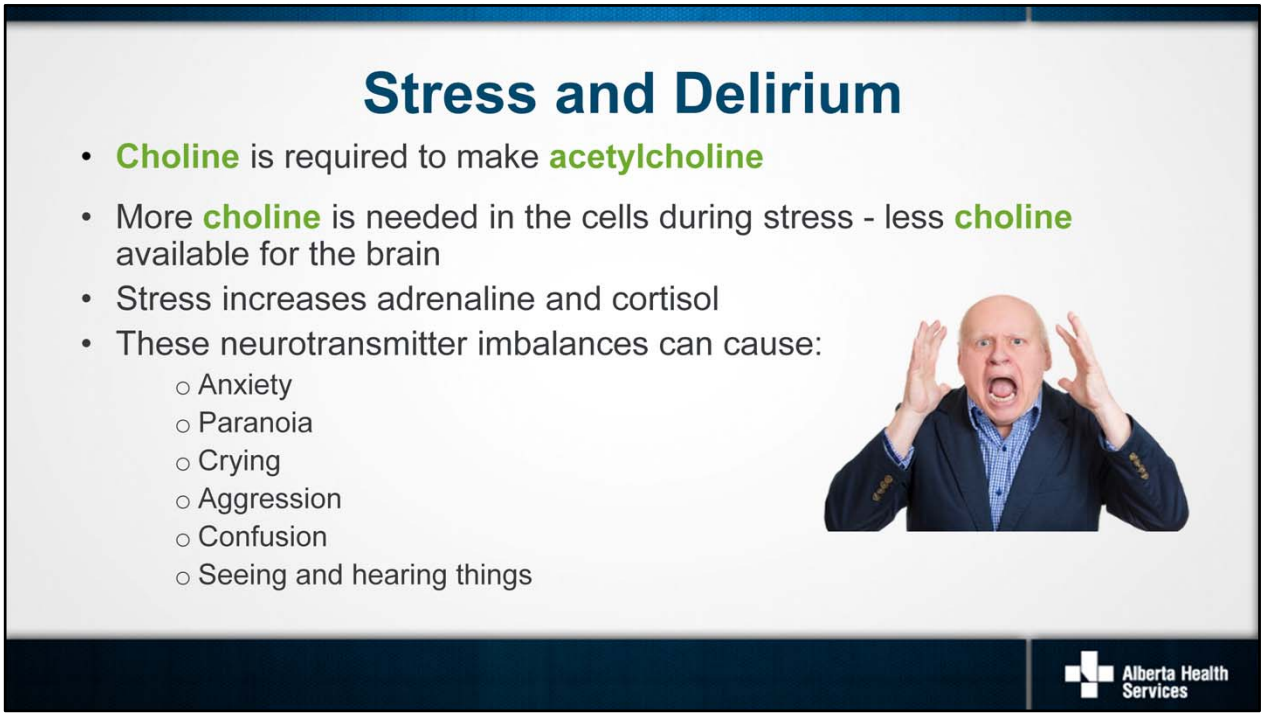
Urine C & S without typical signs of infection leads to false positives

- Diagnosis of UTI is not made on the basis of Urine C&S – Urine C&S is to guide antibiotic selection

Treatment with antibiotics has many unwanted side-effects

- Antibiotic treatment of colonized bacteria leads to resistant bacteria, increased frequency of UTIs, diarrhea etc.
- Antibiotic treatment of colonized bacteria is false assurance that the underlying problem is being treated – meanwhile, dehydration may be the real culprit

References:
http://www.dobugsneeddrugs.org/health-care-professionals/antimicrobial-stewardship-in-ltcf/

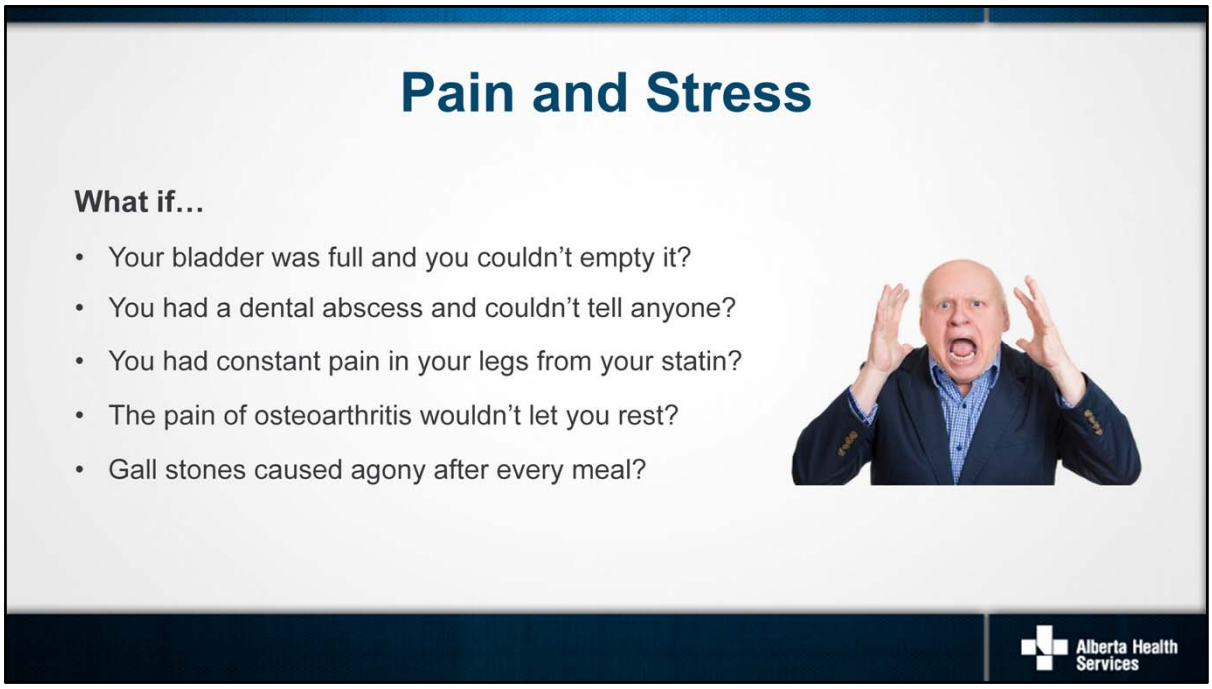


Stress: Stressors may include unrelieved pain, sleep deprivation, urinary retention from prostatic hypertrophy – or anticholinergic burden, noise and overstimulation, uncomfortable temperature, immobility (catheters, wires and monitors, being tethered to devices and monitoring devices) and unfamiliar environment.

- Stress increases the demand for choline in the cells, which decreases the availability of acetylcholine for nerve transmission in the brain.
- Intense emotional or physical stress stimulates excessive adrenaline production which results in excessive dopamine activity in the brain (anxiety, paranoia).
- Stress elevates cortisol: Cortisol elevations decrease serotonin and melatonin
- A drop in the neurotransmitter GABA can also contribute to delirium (e.g. alcohol withdrawal, rapid withdrawal of benzodiazepines). This results in mood changes (as described in the slide)

References:

Piotrowicz K, Klich-Rączka A, Pac A, Zdzienicka A, Grodzicki T. The diurnal profile of melatonin during delirium in elderly patients-preliminary results. Exp Gerontol. 2015 Sep 11;72:45-49
Sharon K. Inouye, M.D., M.P.H. Delirium in Older Persons. N Engl J Med 2006;354:1157-1165
Chen S1, Shi L, Liang F, Xu L, Desislava D, Wu Q, Zhang J. Exogenous Melatonin for Delirium Prevention: a Meta-analysis of Randomized Controlled Trials. Mol Neurobiol. 2015 Jul 21



Anticholinergic medications interfere with a person's ability to empty the bladder, so they are only able to drain a little at a time, and always feel full. This is especially excruciating with an enlarged prostate. *(Verhamme 2008)*

What is the state of the resident's mouth? Do they have their own teeth? Is there a foul odor?

Medication side effects rare in younger people are common in older adults.

- 10% to 33% of patients report muscle aches and pains with statins – but even those who are asymptomatic have evidence of skeletal muscle damage. (The NNT, Ghirlanda 1993, Deichmann 2010)
- Anyone treated with statins for more than 2 years has clinically silent but measurable damage to peripheral nerves , which in later stages can be misdiagnosed as diabetic neuropathy. (Otruba 2011)

Osteoarthritis pain: is worse at rest. Constant movement is an effective distraction and may indicate pain.

References:

Verhamme KM1, Sturkenboom MC, Stricker BH, Bosch R. Drug-induced urinary retention: incidence, management and prevention. Drug Saf. 2008;31(5):373-88.
http://www.thennt.com/nnt/statins-for-heart-disease-prevention-without-prior-heart-disease/
Ghirlanda G, Oradei A, Manto A, Lippa S, Uccioli L, Caputo S, Greco AV, Littarru GP. Evidence of plasma CoQ19-lowering by HMG-CoA reductase inhibitors: a double-blind, placebo-controlled study. J Clin Pharmacol. 1993 Mar; 33(3):226-9.
Deichmann R, Lavie C, Andrews S. Coenzyme q10 and statin-induced mitochondrial dysfunction. Oschner J. 2010 Spring;10(1):16-21.
Otruba P, Kanovsky P, Hlustik P. Treatment with statins and peripheral neuropathy: results of 36-months a prospective clinical and neurophysiological follow-up. Neuro Endocrinol Lett. 2011;32(5):688-90.

Restraints and Stress

Use of physical restraints …

- Was the factor most associated with the likelihood of delirium (Voyer 2009)
- Is associated with a 3-fold increase in chance of delirium persistence at time of discharge (Inouye 2007)

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Imagine yourself strapped into that chair…

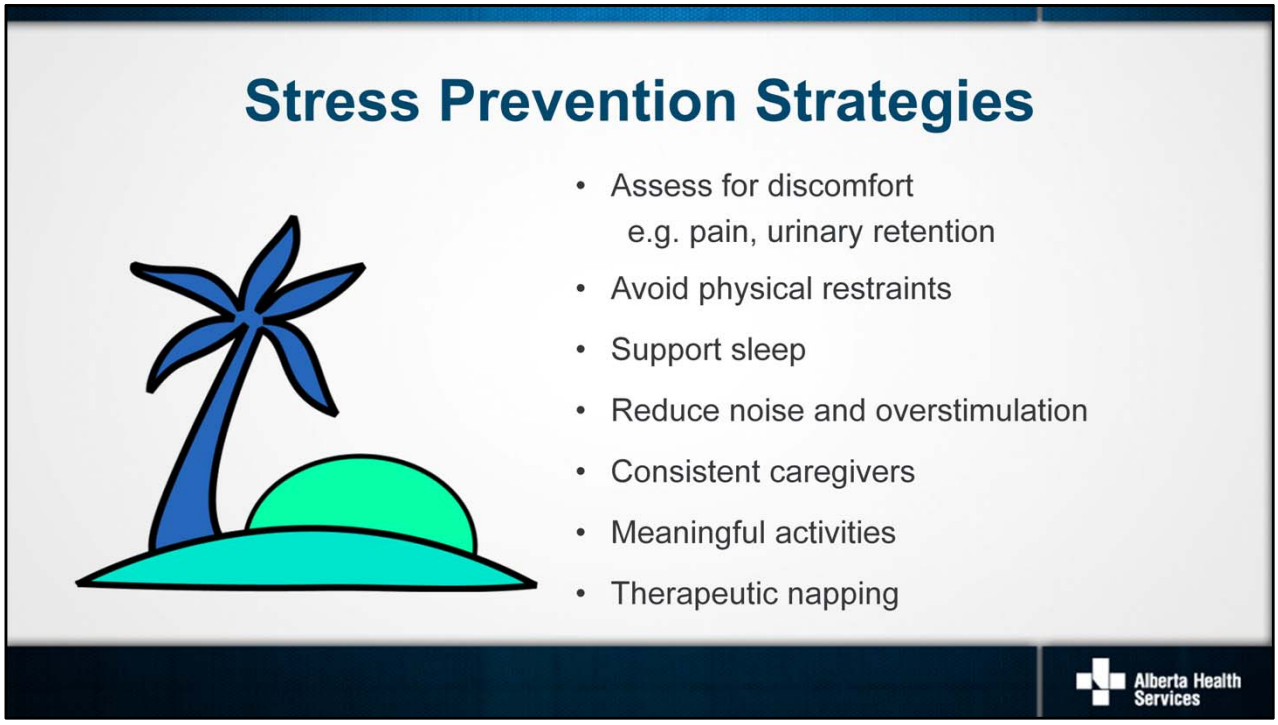
- Agitated and restless, because of disease and medication side-effects
- Uncomfortable – sitting on bunched up clothing and incontinence product
- Reduced ability to communicate: “Hey! Hey! Does anyone have a knife?”
- Can’t get up to go to the bathroom – and the need is becoming more desperate with each passing minute
- Increased struggle interpreted as increased proof of the need for the restraints

Use of physical restraints was the factor most associated with the likelihood of delirium in a study by Voyer (2009)

Physical restraints frequently increase agitation and create additional problems, such as loss of mobility, pressure ulcers, aspiration, and prolonged delirium. In one study, restraint use among patients in a medical inpatient unit was associated with a 3-fold increase in the chance of delirium persistence at the time of discharge. (Inouye 2007)

References

Voyer, P., Richard, S., Doucet, L., Cyr, N., & Carmichael, P. -. Precipitating factors associated with delirium among long-term care residents with dementia. Applied Nursing Research,
Inouye SK, Zhang Y, Jones RN, Kiely DK, Yang F, Marcantonio ER. Risk factors for delirium at discharge: development and validation of a predictive model. [journal article. research support, N.I.H., extramural. research support, non-U.S. gov't]. Arch Intern Med. 2007;167(13):1406–1413.



What are you doing to reduce stress in your facility?

The bulleted items are some strategies used by LTC teams in Alberta.

References:

Piotrowicz K, Klich-Rączka A, Pac A, Zdzienicka A, Grodzicki T. The diurnal profile of melatonin during delirium in elderly patients-preliminary results. Exp Gerontol. 2015 Sep 11;72:45-49

Sharon K. Inouye, M.D., M.P.H. Delirium in Older Persons. N Engl J Med 2006;354:1157-1165

Chen S1, Shi L, Liang F, Xu L, Desislava D, Wu Q, Zhang J. Exogenous Melatonin for Delirium Prevention: a Meta-analysis of Randomized Controlled Trials. Mol Neurobiol. 2015 Jul 21

Voyer, P., Richard, S., Doucet, L., Cyr, N., & Carmichael, P. -. Precipitating factors associated with delirium among long-term care residents with dementia. Applied Nursing Research, 2009.

Inouye SK, Zhang Y, Jones RN, Kiely DK, Yang F, Marcantonio ER. Risk factors for delirium at discharge: development and validation of a predictive model. [journal article. research support, N.I.H., extramural. research support, non-U.S. gov't]. *Arch Intern Med*. 2007;167(13):1406–1413.

Summary

- Those with dementia are already at increased risk of delirium
- Delirium risk increases with:
  - Too many medications
  - Dehydration
  - Malnutrition
  - Stress
  - Infection

While delirium is a multifactorial process, it is estimated that medications alone may account for 12%-39% of all cases of delirium.
(Alagiakrishnan and Wiens 2004)

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- Older people taking five or more medications are at higher risk of delirium and falls, independent of medication indications. (Hubbard 2013)
- In patients discharged to non-home settings, the number of discharge medications and polypharmacy predicted re-hospitalization (Wimmer 2014)
- The prevalence of Potentially Inappropriate Prescriptions according to STOPP criteria is approximately 60% in the nursing home environment…. Adherence to medication regimens decreases as the frequency of daily dosing increases (Millar 2014)

It's important to consider the role of medications, along with other possible stressors.

References:

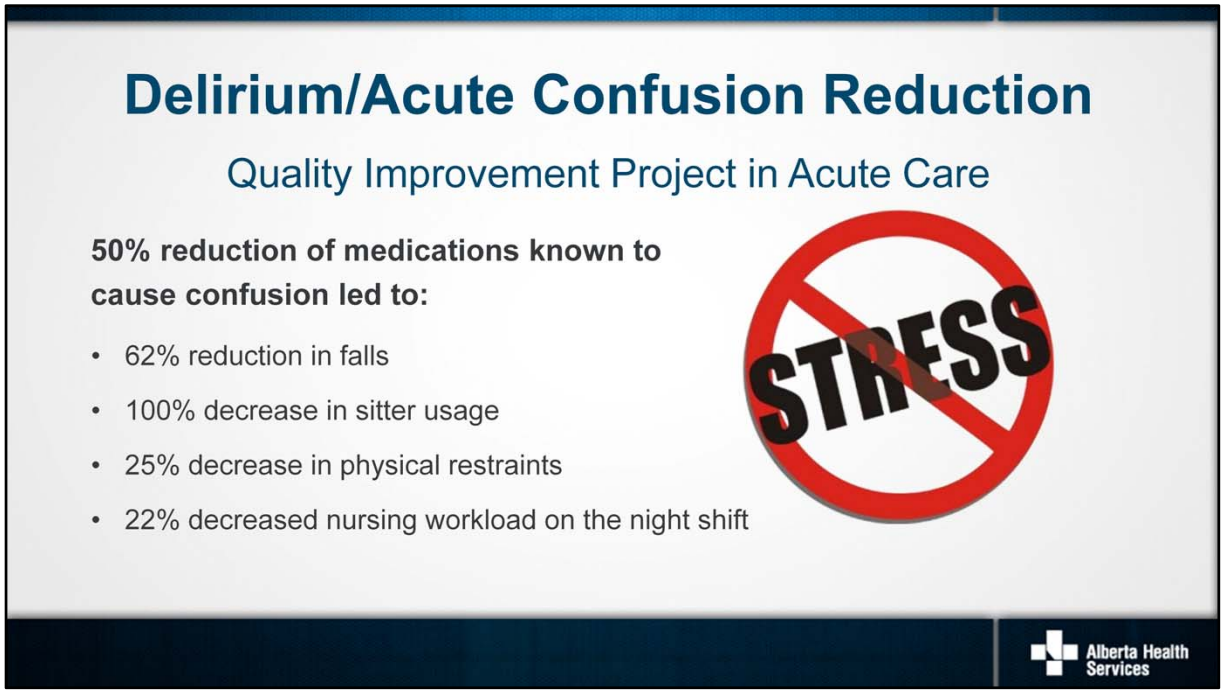
Alagiakrishnan K, Wiens CA. An approach to drug induced delirium in the elderly. Postgrad Med J 2004;80:388–393

Hubbard, Ruth E; O'Mahony, M Sinead; Woodhouse, Kenneth W. Medication prescribing in frail older people
European Journal of Clinical Pharmacology, 03/2013, Volume 69, Issue 3

Wimmer, Barbara C; Dent, Elsa; Bell, J Simon; more… Medication Regimen Complexity and Unplanned Hospital Readmissions in Older People. Annals of Pharmacotherapy, 09/2014, Volume 48, Issue 9

Hubbard, Ruth E; O'Mahony, M Sinead; Woodhouse, Kenneth W. Medication prescribing in frail older people
European Journal of Clinical Pharmacology, 03/2013, Volume 69, Issue 3

Millar A, Hughes C, Passmore A, Ryan C. Intermediate Care: The Role of Medicines Management. Drugs & Aging (DRUGS AGING), Jan2014; 31(1): 21-31. (11p)

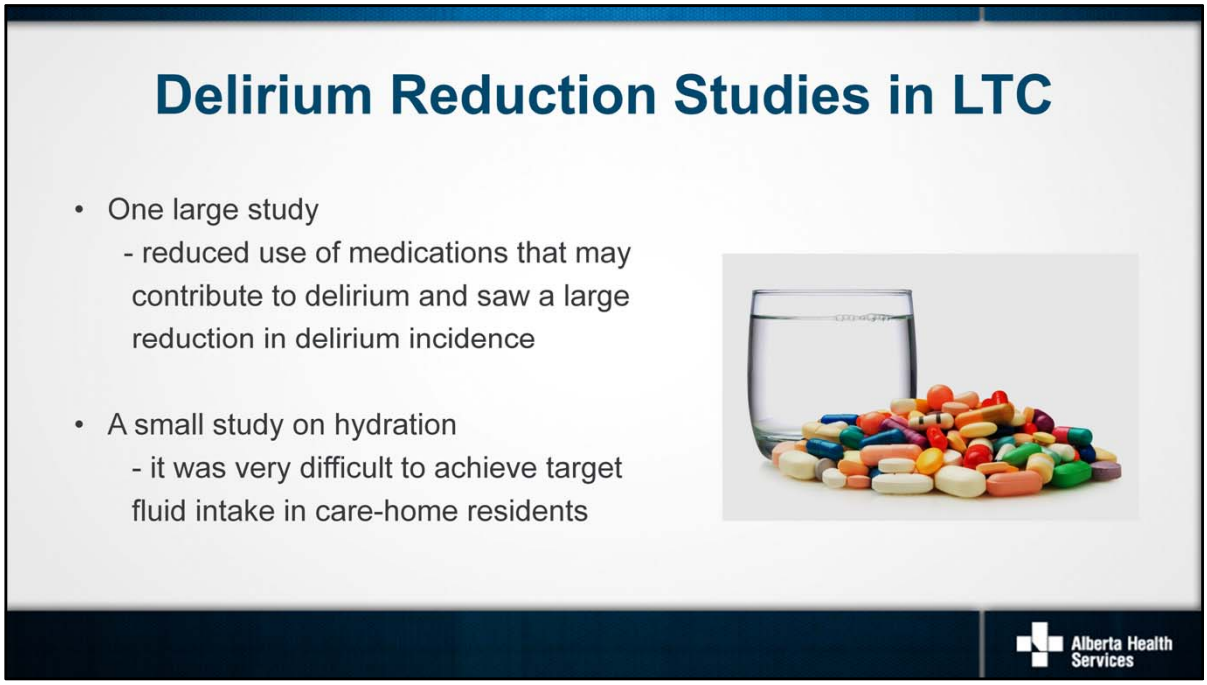


So does delirium risk reduction work in real life situations?
This was a study done in an acute medical-surgical unit: They set out to decrease delirium/acute confusion, and their primary intervention was to reduce the use of medications known to cause confusion in patients older than 70.

Interprofessional team included: pharmacists, OTs, PTs, nurses, and nurses' aides
Common drugs associated with acute confusion were: benzodiazepines, narcotics and drugs with anticholinergic effects. Lorazepam is an independent risk factor for delirium, increasing the risk by approximately 20%! (Pandharipande 2006) They used less Demerol post-op, and complied with Beers list

Non-pharmacologic interventions:
Orientation: Reminiscing therapy, glasses and hearing aides, speak slowly and clearly without background noise, use of nursing presence. **One of the most effective nursing interventions in the orientation protocol was the use of reminiscence.**
Support of sleep: warm de-caffeinated drink, soft music, backrub at bedtime, reduction of clutter in the patient's rooms, use of warmed wash cloths with aloe for bedtime care, reduction of noise levels during evening and night. Light and activity to support day time wakefulness. Dim lighting at night. Reduce interruptions/ consolidate nursing interventions during the night.
Early mobilization: ambulate 3 X per day
Prevention of dehydration, constipation, fluid and electrolyte imbalances, improve hydration, toileting schedules

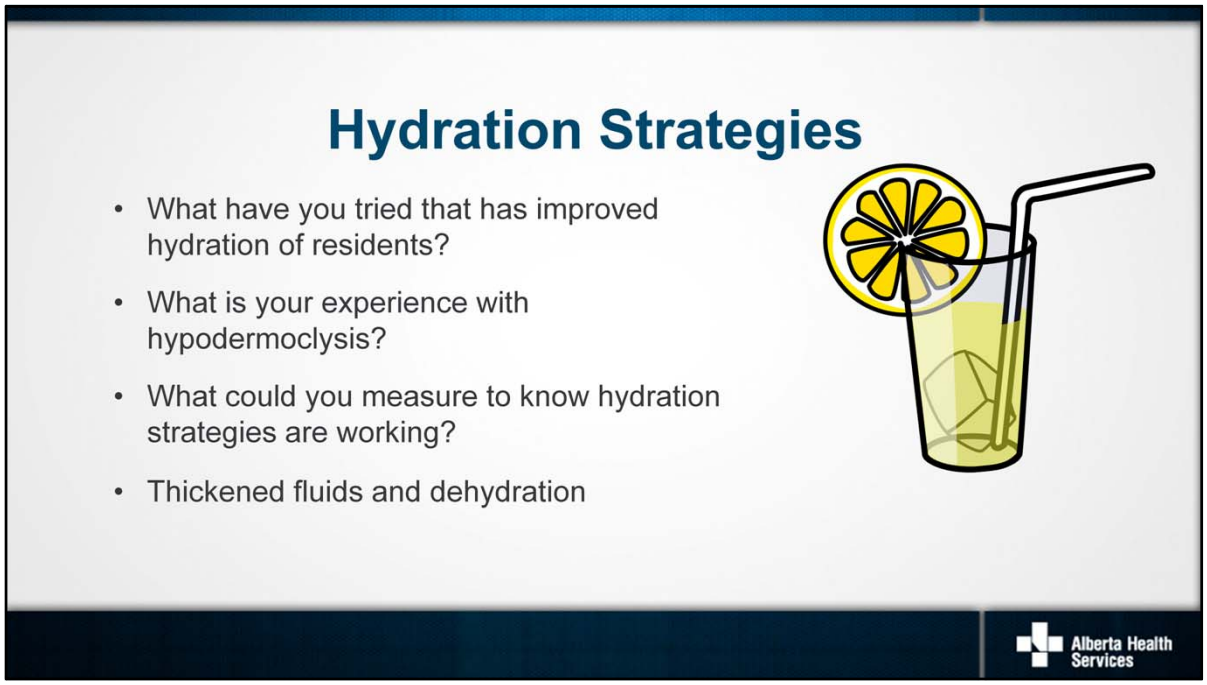
References:
Kratz, A. (2008). Use of the acute confusion protocol: A research utilization project. *Journal of Nursing Care Quality, 23*(4), 331-337.
Pandharipande P, Shintani A, Peterson J, et al. Lorazepam is an independent risk factor for transitioning to delirium in intensive care unit patients. Anesthesiology. 2006;104(1):21.



Medication Reduction:
One study of 3538 residents used a computerised system to identify medications that may contribute to delirium, which triggered a pharmacist-led medication review.

Hydration:
One small study of 98 residents attempted a hydration-based intervention.
They reported no reduction in delirium incidence in the intervention group compared to control.
Results were imprecise, (how do you measure intake precisely? How do you consciously encourage fluids in one group of residents, and not in another?) Achieving target fluid intake in care-home residents is challenging, even in the context of a clinical trial.

References:
Lapane KL, Hughes CM, Daiello LA, Cameron KA, Feinberg J. Effect of a pharmacist-led multicomponent intervention focusing on the medication monitoring phase to prevent potential adverse drug events in nursing homes. Journal of the American Geriatrics Society 2011;59(7):1238-45.
Clegg A, Siddiqi N, Heaven A, Young J, Holt R. Interventions for preventing delirium in older people in institutional long-term care. Cochrane Database Syst Rev. 2014(1):N.PAG-N.PAG 1p.
Culp K, Mentes J, Wakefield B. Hydration and acute confusion in long-term care residents. Western Journal of Nursing Research 2003;25(3):251-66. described in Clegg 2011.



Let's take a look at hydration: It's not easy to encourage fluid intake in those who aren't thirsty, don't like water, don't take initiative to drink on their own, have difficulty swallowing…

Discussion: Let's hear some of your strategies: e.g.
- Hydrate with comfort rounds / with each encounter
- Water cooler available to residents to help themselves
- Rec therapist offers juice/water after activities
- Families involved in drinking fluids with the resident/giving fluids to the resident
- Medication passes – required to complete a small cup of water
- If resident drinks on their own, ask family to bring a water bottle to keep in reach
- For thickened fluids/or residents who tend to drop cups – adult nosey cups allow independence
- Volunteers do "hydration rounds" – pass out drinks to the residents
- Fluids of choice – what people prefer to drink
- Consider flavoured drops in water instead of juice, mixing juice and water

Thickened fluids increase risk for dehydration: taste, texture, visual appeal. Studies report that though it's possible to absorb fluids from thickened fluids adequately, staff were less likely to offer fluids to those on thickened fluids (almost a litre less per day: 2575 ml vs 1589 ml McGrail 2015)
Need to provide at least 1500 ml per day to prevent dehydration: 1100-1200 as thick fluids, and 600 – 800 mls as high fluid foods through meals and snacks (e.g. applesauce, soup, cooked cereal)

References:
McGrail, Anne; Kelchner, Lisa. Barriers to oral fluid intake: beyond thickened liquids The Journal of neuroscience nursing : journal of the American Association of Neuroscience Nurses, 02/2015, Volume 47, Issue 1

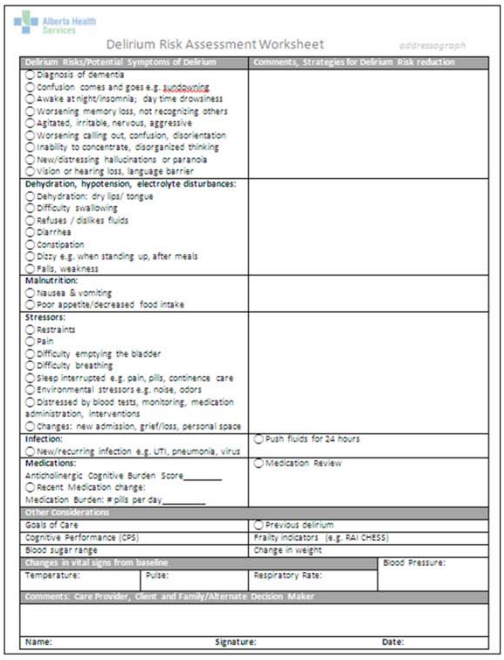
Delirium Risk Assessment

Goals:

- Protect physical and cognitive function
- Protect comfort
- Identify anticholinergic and pill burden
- Identify and reduce delirium risk

Consider:

- Interdisciplinary team observations
- Family/client concerns
- Factors that may increase risk of delirium, dehydration, malnutrition, infection or stress



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Delirium Risk Assessment Worksheet

addressograph

Delirium Risks/Potential Symptoms of Delirium	Comments, Strategies for Delirium Risk reduction
◯ Diagnosis of dementia ◯ Confusion comes and goes e.g. sundowning ◯ Awake at night/insomnia; day time drowsiness ◯ Worsening memory loss, not recognizing others ◯ Agitated, irritable, nervous, aggressive ◯ Worsening calling out, confusion, disorientation ◯ Inability to concentrate, disorganized thinking ◯ New/distressing hallucinations or paranoia ◯ Vision or hearing loss, language barrier	
Dehydration, hypotension, electrolyte disturbances: ◯ Dehydration: dry lips/ tongue ◯ Difficulty swallowing ◯ Refuses / dislikes fluids ◯ Diarrhea ◯ Constipation ◯ Dizzy e.g. when standing up, after meals ◯ Falls, weakness	
Malnutrition: ◯ Nausea & vomiting ◯ Poor appetite/decreased food intake	
Stressors: ◯ Restraints ◯ Pain ◯ Difficulty emptying the bladder ◯ Difficulty breathing ◯ Sleep interrupted e.g. pain, pills, continence care ◯ Environmental stressors e.g. noise, odors ◯ Distressed by blood tests, monitoring, medication administration, interventions ◯ Changes: new admission, grief/loss, personal space	
Infection: ◯ New/recurring infection e.g. UTI, pneumonia, virus	◯ Push fluids for 24 hours
Medications: Anticholinergic Cognitive Burden Score_____ ◯ Recent Medication change: Medication Burden: # pills per day_____	◯ Medication Review
Other Considerations	
Goals of Care	◯ Previous delirium
Cognitive Performance (CPS)	Frailty Indicators (e.g. RAI CHESS)
Blood sugar range	Change in weight
Changes (+/-) to Vitals from baseline	Blood Pressure:
Temperature: / Pulse:	Respiratory Rate:
Comments: Care Provider, Client and Family/Alternate Decision Maker	
Name:	Signature: Date:

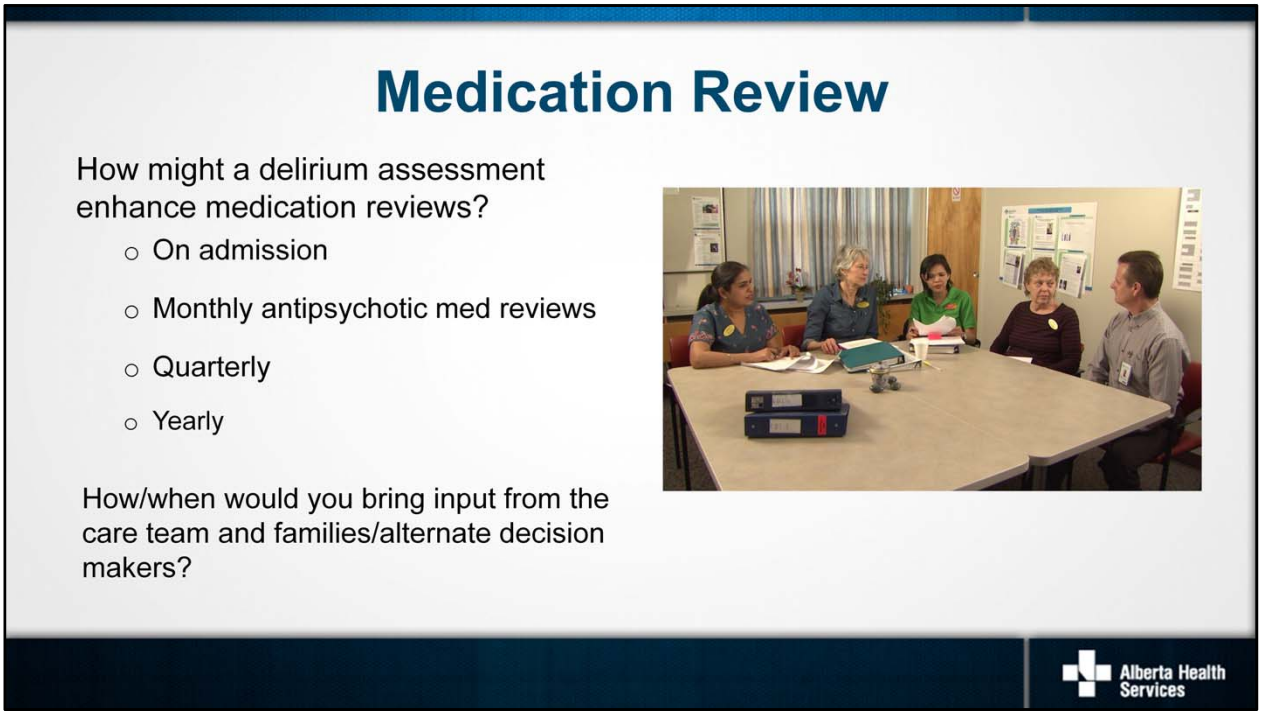
The Delirium Risk Assessment worksheet can be used by care teams on admission, prior to scheduled medication reviews, with changes in behaviour or changes in medication. It's one way to collect observations from the care team and family that can be used to prevent delirium, or to trigger a full medication review.

- Are there signs of dehydration such as dry lips and tongue?
- Does the resident refuse all pills (how does this impact comfort?)
- Does the resident vomit after the breakfast cocktail of 18 pills?
- Might anticholinergic side effects such as urinary retention be causing agitation?
- Is sleep disrupted by pills or drug side effects?
- Does the resident have chest pain after lunch, or are they falling frequently?

We often have the perception that reducing medications is only for extreme frailty or end of life, when we're "giving up" on optimal treatment.

Instead, the focus needs to be on maintaining function (cognitive, physical, psychological) and comfort.

Consider hydration needs before requesting medication changes (e.g. for low blood pressure, increased confusion)



Drug-induced delirium is being increasingly identified in hospitalized patients. The findings suggest that interventions focusing on adverse drug effects have the greatest potential for preventing delirium. (Yin 2010)

It has been noted that continuing care standards require medication reviews on admission, quarterly and yearly, but do not spell out what that might look like.

What suggestions would you have for the focus of each of these reviews?

How might the delirium risk assessment worksheet enhance scheduled medication reviews?

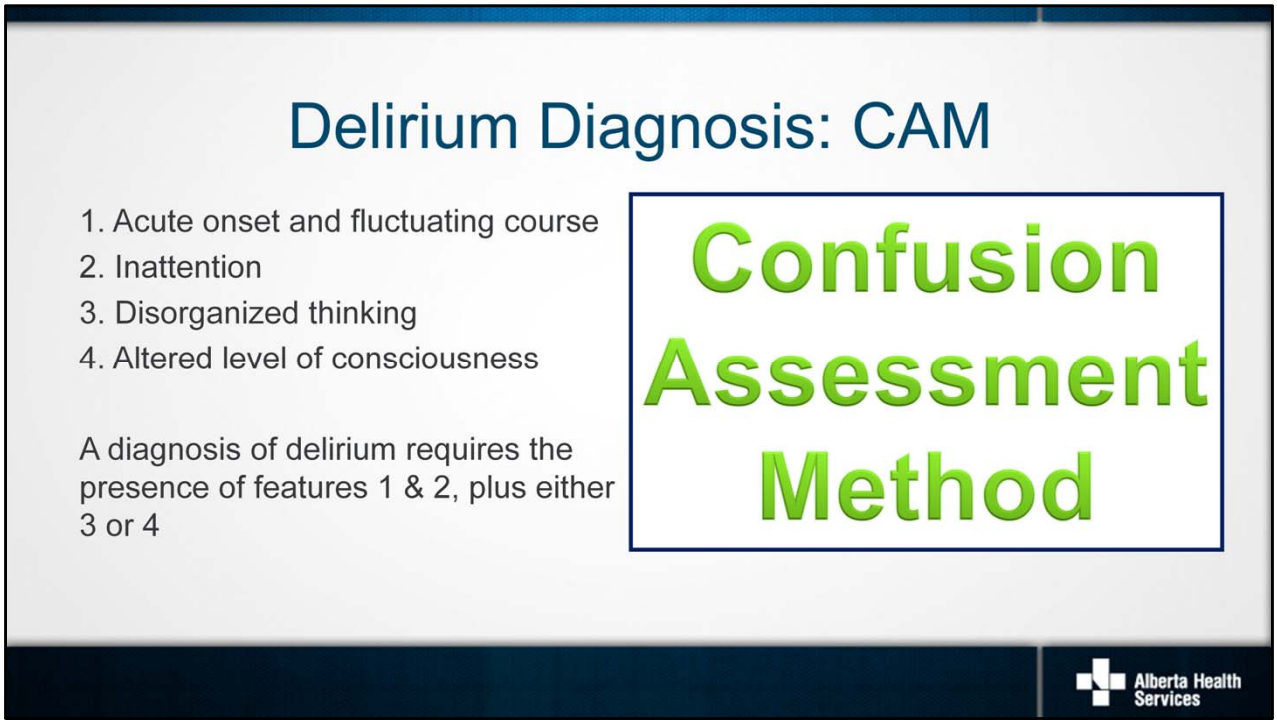
When do you involve families and alternate decision makers?
What have you learned about involving families? (From things that did or didn't go well)

Explore understanding of an alternate decision maker's right to receive a medication list versus access to the chart.

How/when will you include input from the care team?

References:

Yin R Y, Heacock LC, Fogel JF. Drug-Induced, Dementia-Associated and Non-Dementia, Non-Drug Delirium Hospitalizations in the United States, 1998-2005. Drugs Aging 2010;27(1):51-61

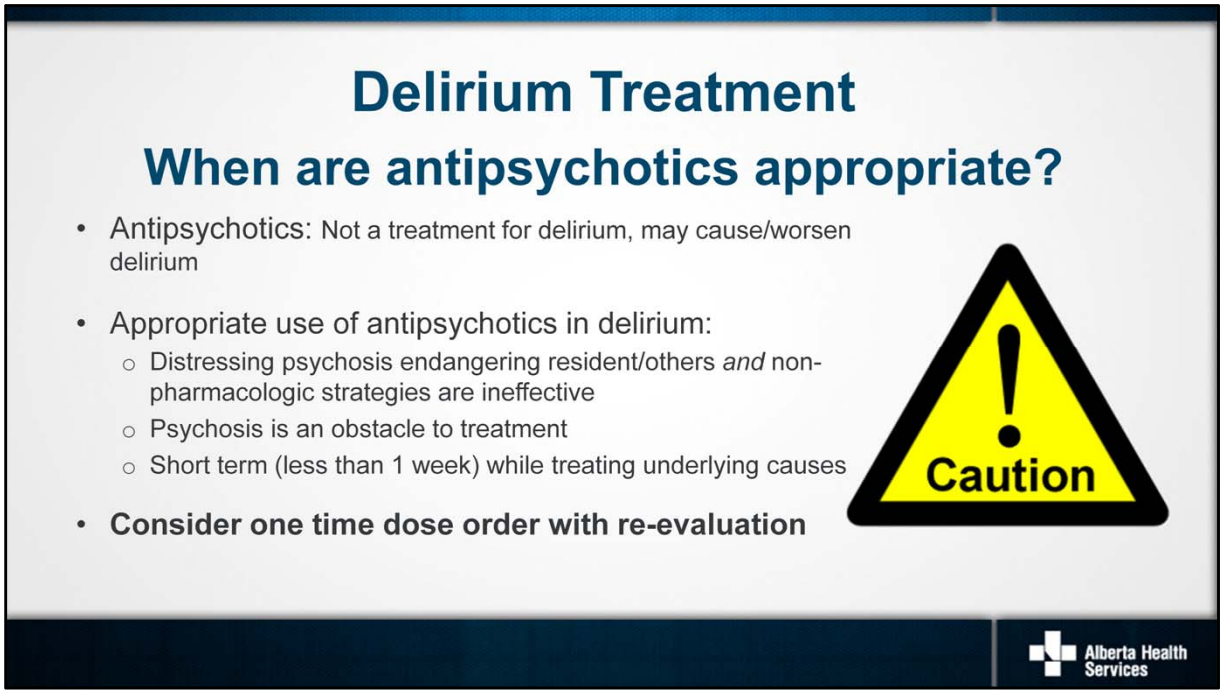


Though we'd love to believe it's possible to prevent delirium 100% of the time, this isn't realistic.

The Confusion Assessment Method is the validated tool to confirm a diagnosis of delirium.

Delirium is a medical emergency that should be followed up by immediate assessment and attention to underlying causes.

Dehydration and anticholinergic burden must always be considered, though delirium is usually the result of a combination of stressors.



- The literature before 2010 repeatedly describes antipsychotics as a treatment for delirium. In 2010, NICE National Clinical Guideline Centre decided not to recommend antipsychotic treatment of delirium; risks outweighed benefits
- Antipsychotics themselves may cause or worsen delirium.
    - If primary cause of delirium is anticholinergic cognitive burden overload or medication toxicity, adding another drug will likely complicate the delirium.
    - If the primary cause is dehydration, antipsychotic use must be combined with IV or s/c fluids; increased sedation will worsen dehydration.

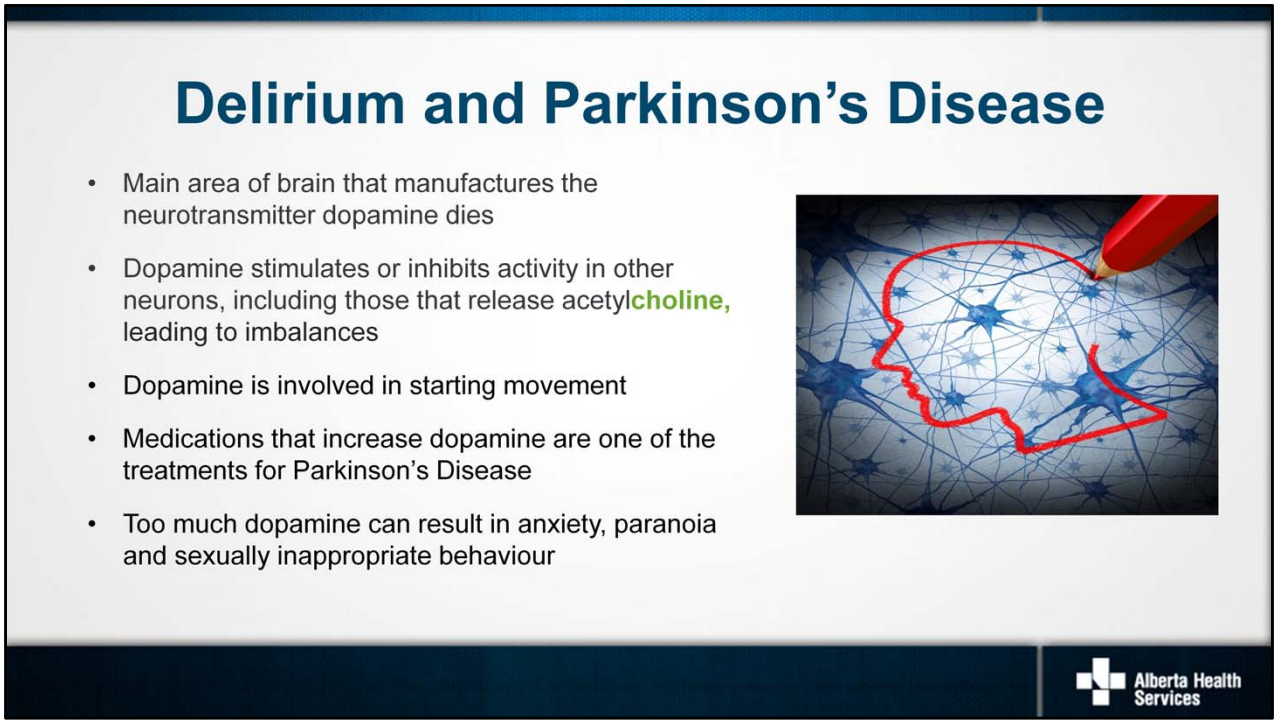
What is appropriate use of antipsychotics in Delirium? Short term (less than 1 week – better yet, ONE low dose and re-evaluate) if agitation/aggression and psychosis poses a safety risk and non-pharmacologic strategies are ineffective. Non-pharm strategies DO NOT INCLUDE physical restraints, the stress of which can cause and worsen delirium.

- Non-pharmacologic strategies: hydration, 1:1 observation with reassurance, music therapy, safe-wandering rooms with close observation

In older persons with a delirium where pharmacotherapy is indicated, low dose, short-term therapy with haloperidol or an atypical antipsychotic (e.g., olanzapine, quetiapine, risperidone) can be considered. Haloperidol is not recommended if there is pre-existing Parkinson disease or Lewy body dementia (2014 CCSMH guideline update)

References:

NICE National Clinical Guideline Centre, Clinical Guideline 103, Delirium: prevention, diagnosis and management; Full Guideline July 2010. ; http://www.nice.org.uk/guidance/cg103/evidence/full-guideline-134653069
http://www.ccsmh.ca/pdf/guidelines/2014-ccsmh-Guideline-Update-Delirium.pdf
Leentjens AFG, Molag ML, Van Munster BC, et al. Changing perspectives on delirium care: The new Dutch guideline on delirium. J Psychosom Res. Sep 2014;77(3):240-241.



Delirium is more common in someone with Parkinson's disease and anti-Parkinson's medications are often the culprit. First approach should be to reduce Parkinsons medication dosages rather than add an antipsychotic.

Medications with Dopaminergic effect replace the neurotransmitter dopamine.
While levodopa (Sinemet) is converted in the brain into dopamine, dopamine agonists actually mimic the effects of dopamine without having to be converted. Examples are bromocriptine, pramipexole, ropinirole

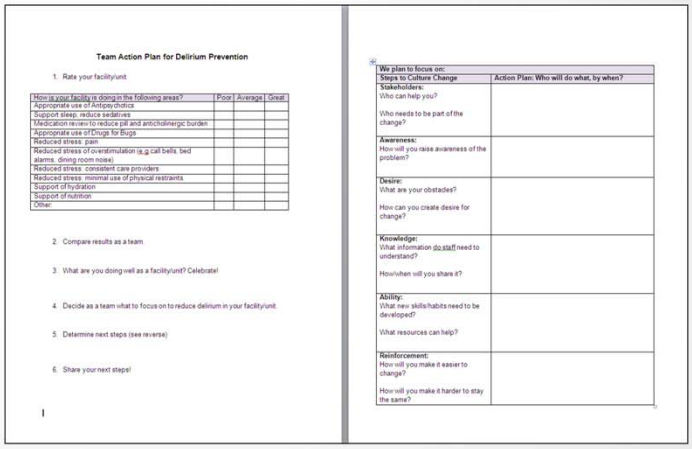
What are the Side Effects? Nausea, vomiting, dizziness due to hypotension, sleepiness, visual hallucinations, confusion, impulse control disorder (such as uncontrolled shopping, gambling, eating, and sexual urges.)

Although higher doses of levodopa are known to be related clinically to hallucinations in individual patients, the results suggest that several underlying characteristics of patients with Parkinson's disease (disease severity, dementia, depression, worse visual acuity) may be more important determinants of which patients experience hallucinations (Holroyd 2001)

Reference:
Prospective study of hallucinations and delusions in Parkinson's disease, Journal Neurosurgical Psychiatry 2001; 70:734-738. S. Hoyroyd, L. Currie, G.F. Wooten

Team Planning & Report Back

- What are you already doing well?
- Where do you have room for improvement?
- What are your priorities and next steps?



Team Action Plan for Delirium Prevention

1. Rate your facility/unit

How is your facility is doing in the following areas?	Poor	Average	Great
Appropriate use of Antipsychotics			
Support sleep, reduce sedatives			
Medication review to reduce pill and anticholinergic burden			
Appropriate use of Drugs for Bugs			
Reduced stress: pain			
Reduced stress of overstimulation (e.g. call bells, bed alarms, dining room noise)			
Reduced stress: consistent care providers			
Reduced stress: minimal use of physical restraints			
Support of hydration			
Support of nutrition			
Other:			

2. Compare results as a team
3. What are you doing well as a facility/unit? Celebrate!
4. Decide as a team what to focus on to reduce delirium in your facility/unit.
5. Determine next steps (see reverse)
6. Share your next steps!

We plan to focus on:	
Steps to Culture Change	**Action Plan: Who will do what, by when?**
Stakeholders: Who can help you? Who needs to be part of the change?	
Awareness: How will you raise awareness of the problem?	
Desire: What are your obstacles? How can you create desire for change?	
Knowledge: What information do staff need to understand? How/when will you share it?	
Ability: What new skills/habits need to be developed? What resources can help?	
Reinforcement: How will you make it easier to change? How will you make it harder to stay the same?	

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Provide 20-30 minutes for team action planning.

Be ready to report back: one thing you're doing great in, one thing you'd like to work on

It's important that you don't ignore those who are resistant to change! They may be very influential!

Consult them about their concerns, and ideas that could improve care in your facility. The team action plan for delirium prevention, strategies to support sleep, and facility strengths assessment are tools you can use to consult front line staff.

Involve them. The more people involved, the more likely you are to reach critical mass – and for people to buy-in, because they have a say.

Collaborate: Powerful things happen when people work together to solve problems. Often, there are front line providers with valuable information or an approach that works well. Collaboration enables everyone on the team to share ideas and strategies, and learn from each other.

Empower: The more empowered staff feel, the more likely they are to bring forward ideas and solutions, and work towards improving quality of life and the work environment. The AUA project can be a catalyst for the many good things your facility chooses to do in the future!

For more change management and staff engagement resources, see QI Project: Reduce Antipsychotics