Great Debates & Updates

# Diabetic Foot

HMP Global

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# Diabetic Peripheral Neuropathy: What You Can't Feel Can Hurt You

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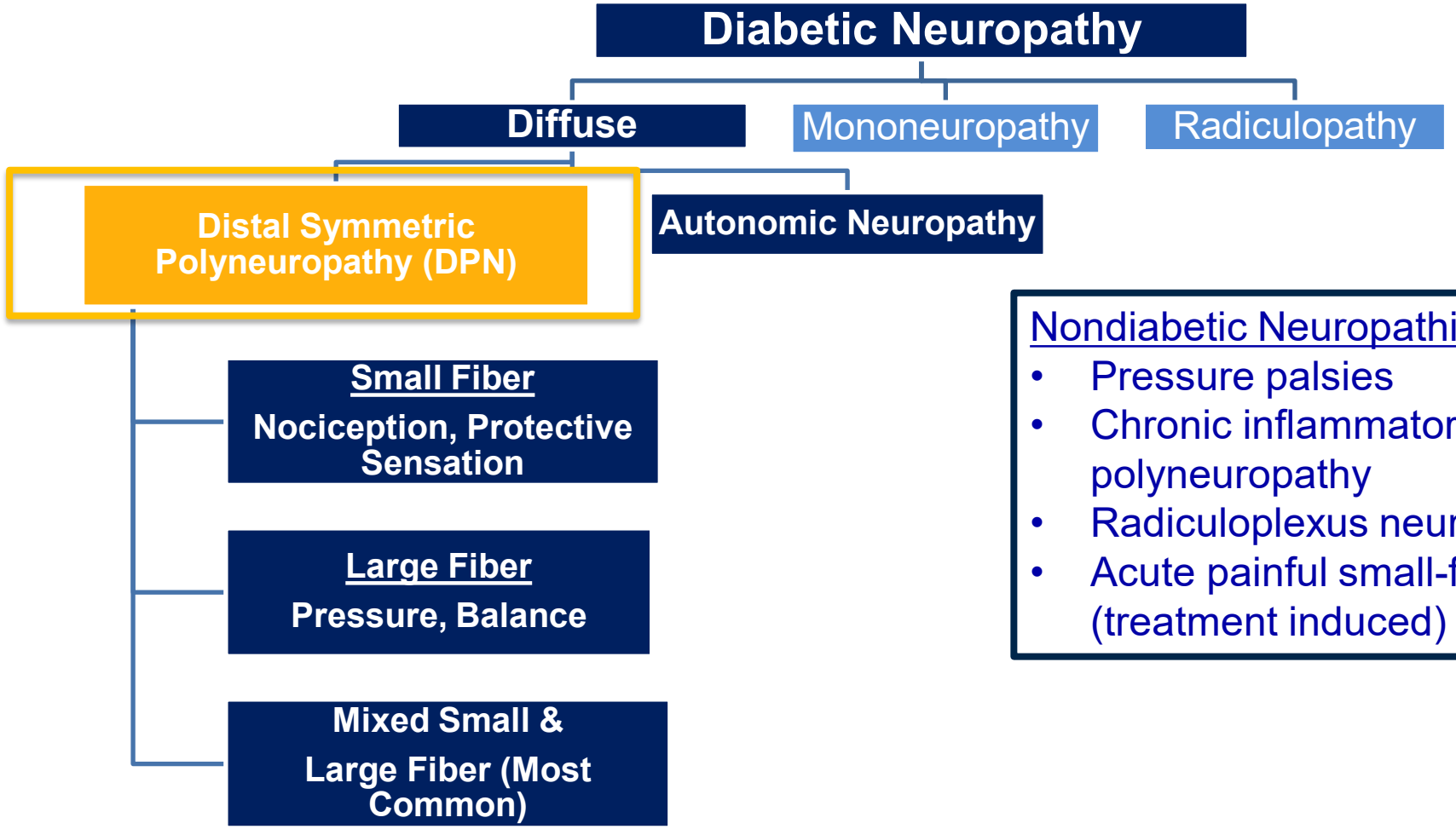
# Disclosures

**Rodica Busui, MD, PhD**: Averitas Pharma, Boehringer-Ingelheim, Nevro, Novo-Nordisk, Procter & Gamble, Regenacy, Roche; Grant/research support: NIDDK, American Diabetes Association, JDRF

# Outline

- Diabetic peripheral neuropathy: What is it and how prevalent is it?
- Clinical impact: Individual and societal impact – what one can’t feel can hurt

# Diabetic Neuropathies-Broad Spectrum

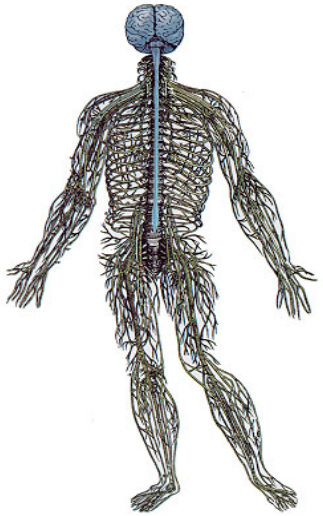


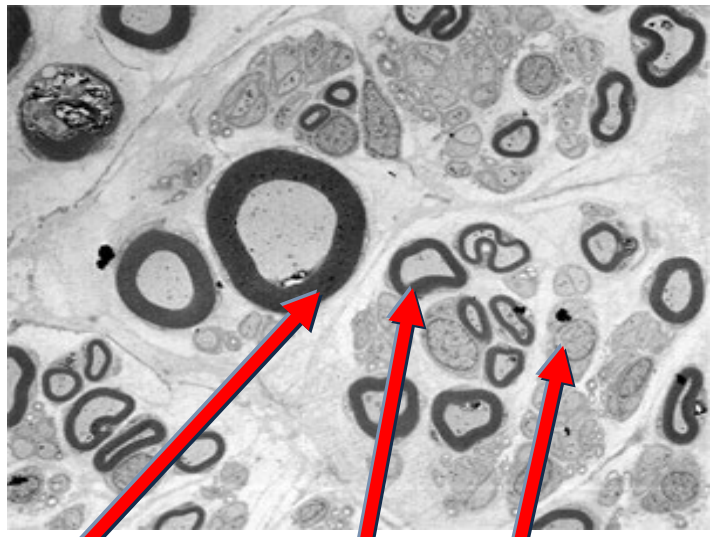

Nondiabetic Neuropathies common in diabetes

- Pressure palsies
- Chronic inflammatory demyelinating polyneuropathy
- Radiculoplexus neuropathy
- Acute painful small-fiber neuropathies (treatment induced)

Adapted from Pop-Busui R, et al. *Diabetes Care.* 2017;40:136-154.

# Diabetic Peripheral Neuropathy (DPN)





Large myelinated fiber

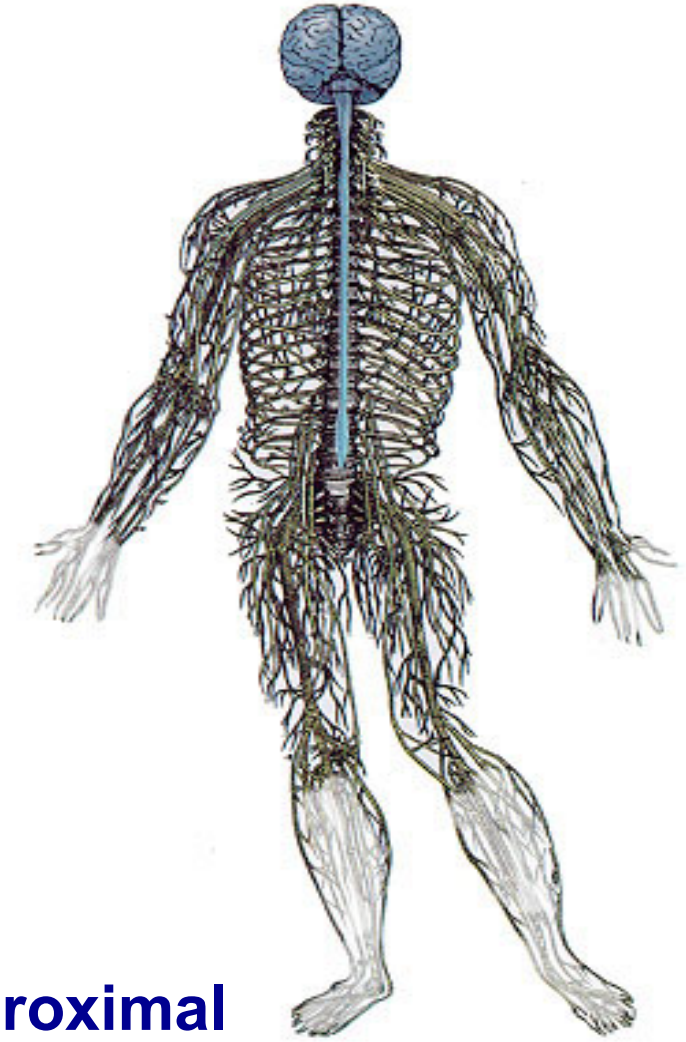
Small myelinated fiber

Unmyelinated fibers

Small Fibers

↓

Large Fibers



Distal → Proximal

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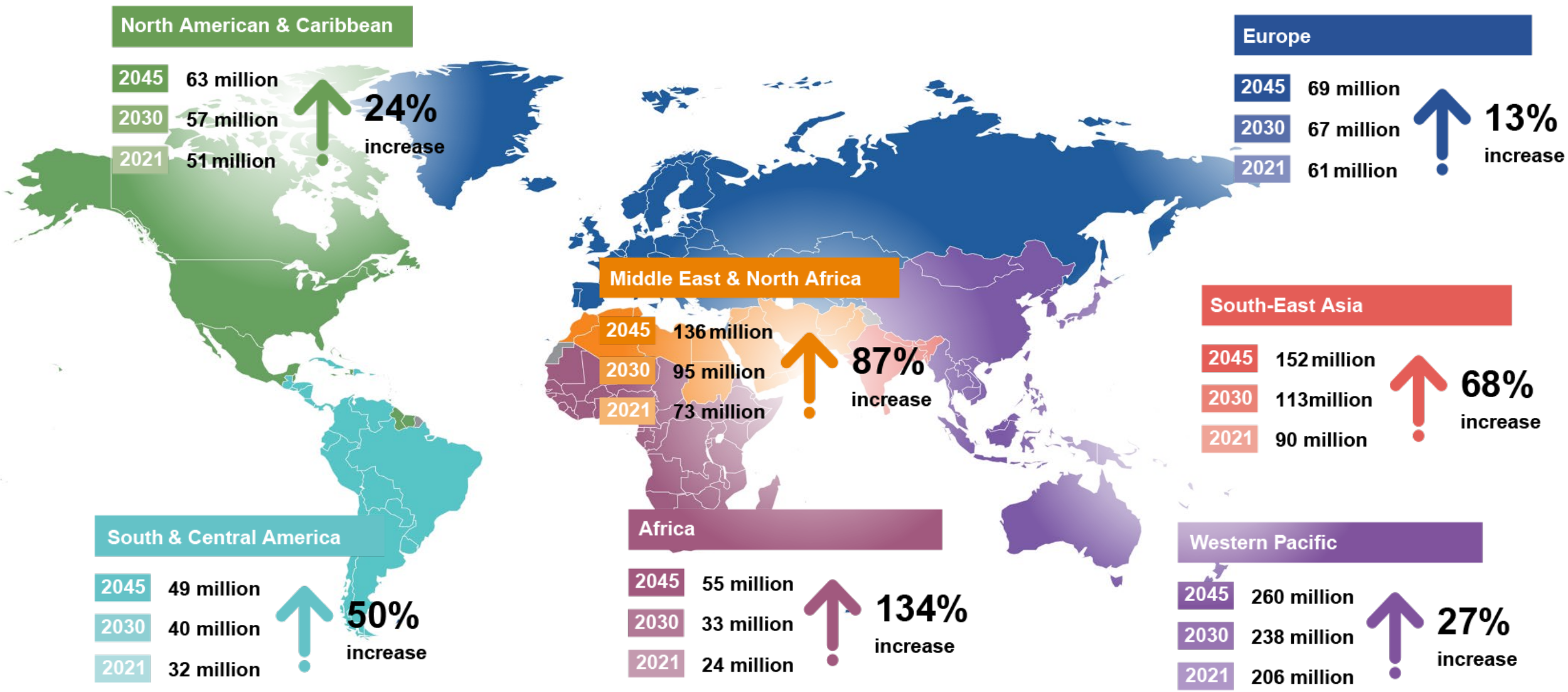
# Diabetes Global Epidemiology 2022




International Diabetes Federation. *IDF Diabetes Atlas*. 10th ed. International Diabetes Federation; 2021.

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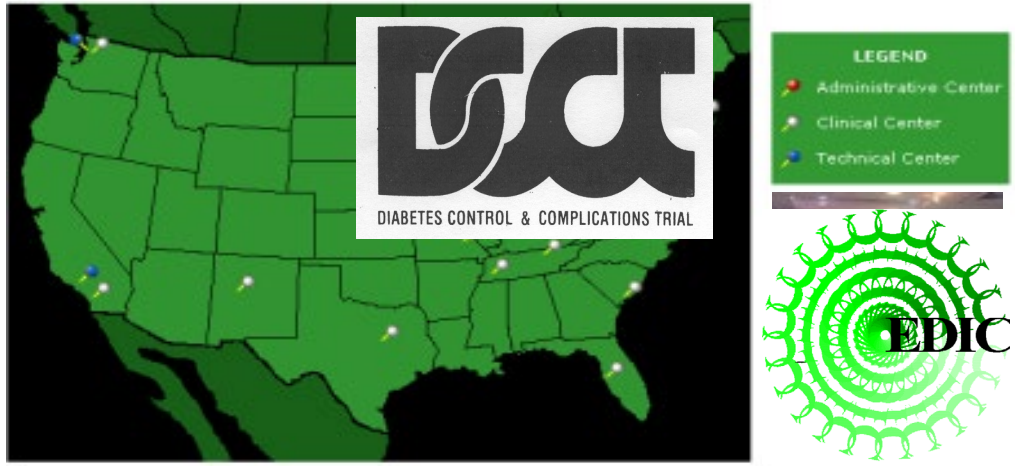
Action to Control Cardiovascular Risk in Diabetes

ACCORD

steno




GRADE

Glycemia Reduction Approaches in Diabetes:
A Comparative Effectiveness Study (GRADE)

addition

SDRNT1BIO

SCOTTISH DIABETES RESEARCH NETWORK
TYPE 1 BIORESOURCE

T1D Exchange

N
W E
SEARCH
For Diabetes in Youth

diabeteslongevity.ca

BARI 2D

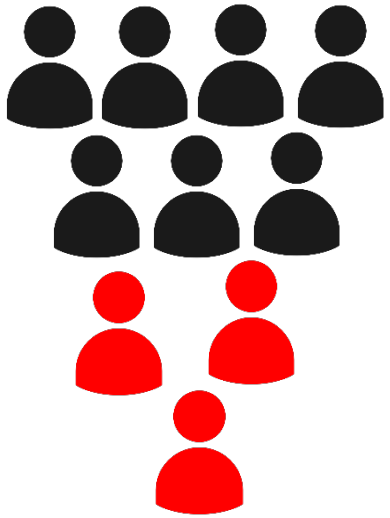
Bypass Angioplasty
Revascularization 2 Diabetes

# Magnitude of the Problem: Prevalence of Neuropathy in Diabetes

> 10,000 T1D

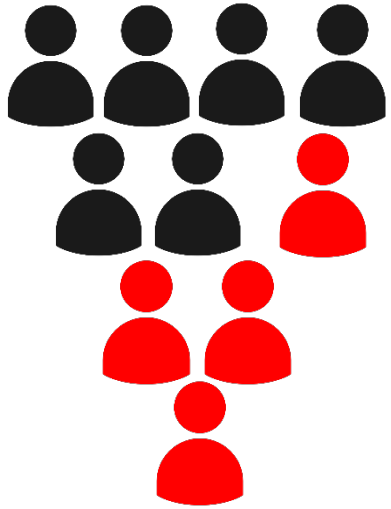
## Type 1 Diabetes

### DPN



Up to 30% after
>25 years of diabetes

### Autonomic Neuropathy

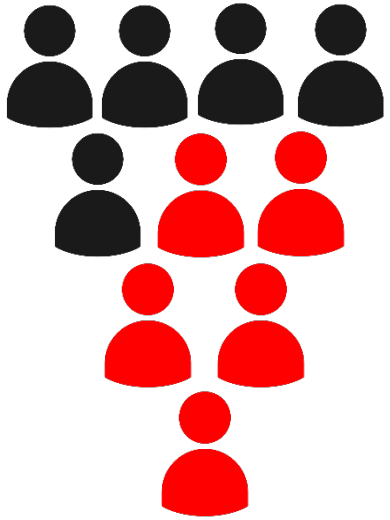


Up to 40% after
>25 years of diabetes

## Type 2 Diabetes

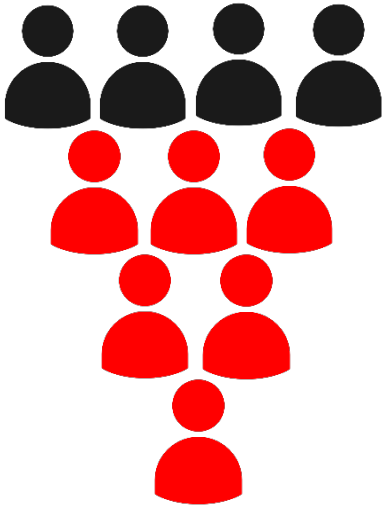
> 30,000 T2D

### DPN



Up to 50% after 10
years of T2D

### Autonomic Neuropathy

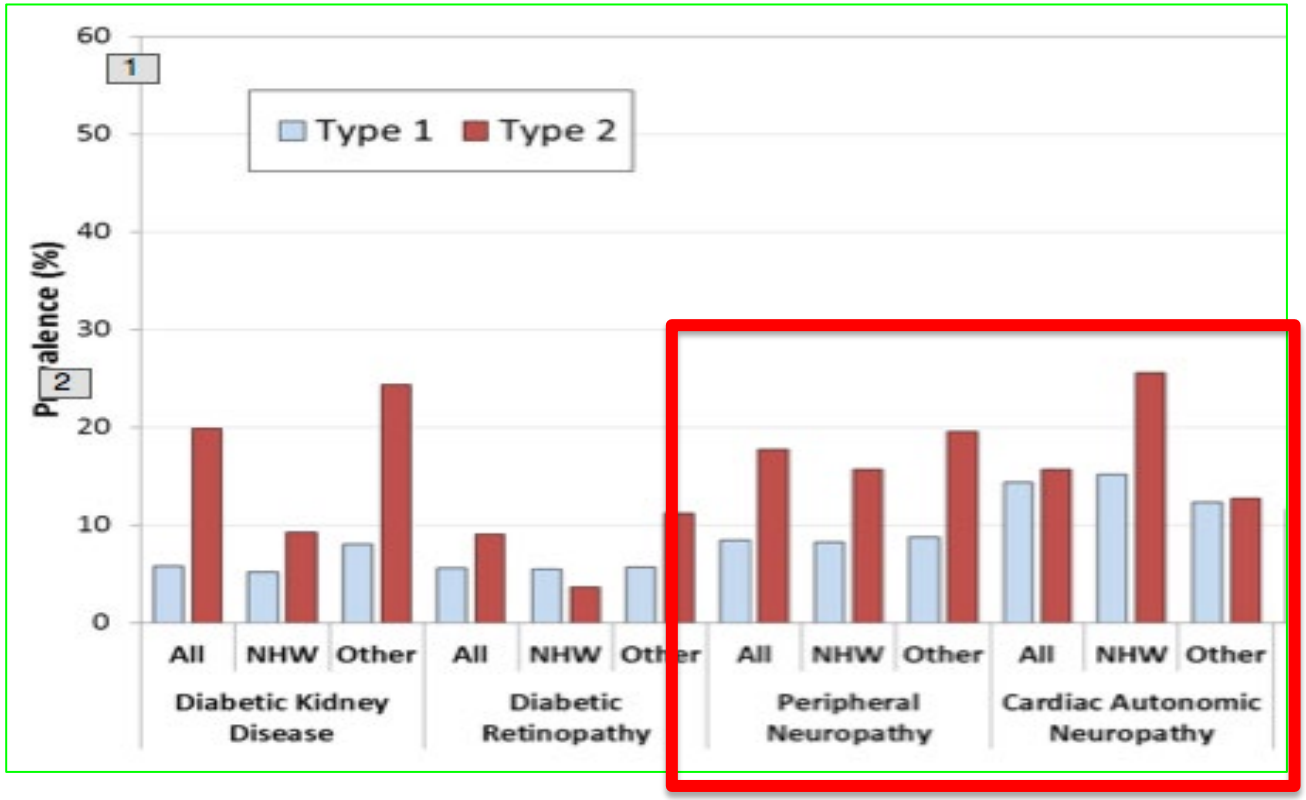


Up to 60% after
15 years of T2D

Pop-Busui R, et al. *Diabetes Care*, 2017;40(1):136-154. Braffet, et al. *Diabetes Care.* 2020;69:1000-1010. Mizokami-Stout, et al, *Diabetes Care.* 2020:43(4):806-812. Mather, et al. *Diabetes Res Clin Pract.* 2020;165:108235. Anderson, et al. *Diabetes Care.* 2018;41(12):2586-2594. Ang L, et al. *J Diabetes Complications*. 2022;36(11):108334.

# DPN and CAN Are Prevalent in Youth

## High prevalence rates in youth with T1D and T2D




**Up to 20%**

**DPN: MNSI**

**CAN: Deep breathing, HRV**

Pop-Busui R, et al. Diabetes Care. 2017;40(1):136-154. Dabelea D, et al. *JAMA*. 2017;317(8):825-835.

# Outline

- Diabetic peripheral neuropathy: What is it and how prevalent is it?
- Clinical impact: Individual and societal impact – what one can’t feel can hurt

# Large Myelinated Fibers and Clinical Care Impact

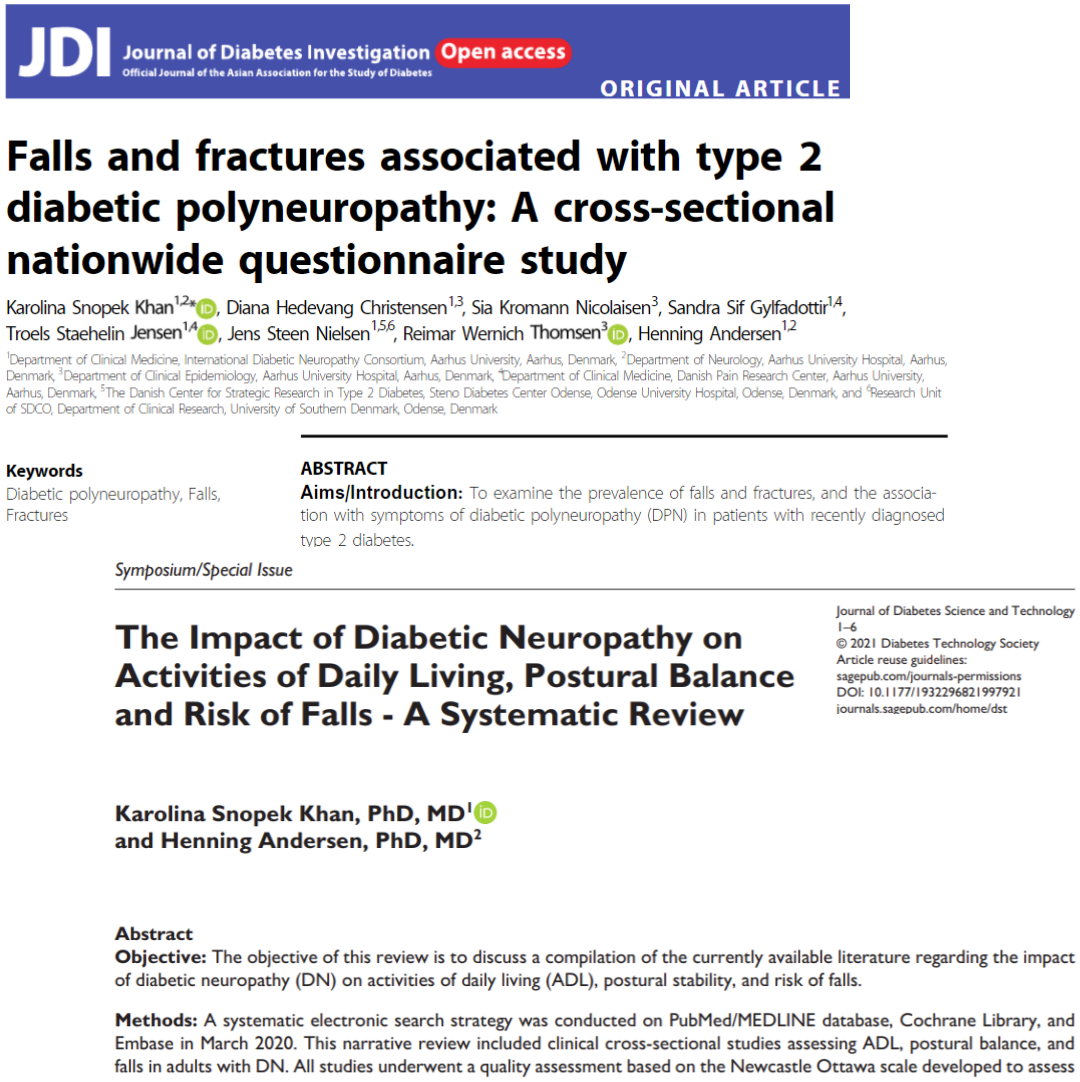
**Large Myelinated Fibers**

## Nerve Function

- Pressure
- Balance

Pop-Busui R, et al. *Diabetes Care*. 2017;40(1):136-154.

# What One Can't Feel Can Hurt!



JDI Journal of Diabetes Investigation Open access
Official Journal of the Asian Association for the Study of Diabetes
ORIGINAL ARTICLE

**Falls and fractures associated with type 2 diabetic polyneuropathy: A cross-sectional nationwide questionnaire study**

Karolina Snopek Khan[1,2*], Diana Hedevang Christensen[1,3], Sia Kromann Nicolaisen[3], Sandra Sif Gylfadottir[1,4], Troels Staehelin Jensen[1,4], Jens Steen Nielsen[1,5,6], Reimar Wernich Thomsen[3], Henning Andersen[1,2]

[1]Department of Clinical Medicine, International Diabetic Neuropathy Consortium, Aarhus University, Aarhus, Denmark, [2]Department of Neurology, Aarhus University Hospital, Aarhus, Denmark, [3]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark, [4]Department of Clinical Medicine, Danish Pain Research Center, Aarhus University, Aarhus, Denmark, [5]The Danish Center for Strategic Research in Type 2 Diabetes, Steno Diabetes Center Odense, Odense University Hospital, Odense, Denmark, and [6]Research Unit of SDCO, Department of Clinical Research, University of Southern Denmark, Odense, Denmark

**Keywords**
Diabetic polyneuropathy, Falls, Fractures

**ABSTRACT**
**Aims/Introduction:** To examine the prevalence of falls and fractures, and the association with symptoms of diabetic polyneuropathy (DPN) in patients with recently diagnosed type 2 diabetes.

*Symposium/Special Issue*

**The Impact of Diabetic Neuropathy on Activities of Daily Living, Postural Balance and Risk of Falls - A Systematic Review**

Journal of Diabetes Science and Technology
1–6

DOI: 10.1177/1932296821997921
journals.sagepub.com/home/dst

**Karolina Snopek Khan, PhD, MD[1] and Henning Andersen, PhD, MD[2]**

**Abstract**
**Objective:** The objective of this review is to discuss a compilation of the currently available literature regarding the impact of diabetic neuropathy (DN) on activities of daily living (ADL), postural stability, and risk of falls.

**Methods:** A systematic electronic search strategy was conducted on PubMed/MEDLINE database, Cochrane Library, and Embase in March 2020. This narrative review included clinical cross-sectional studies assessing ADL, postural balance, and falls in adults with DN. All studies underwent a quality assessment based on the Newcastle Ottawa scale developed to assess

- Individuals with DPN have an increased risk of falling due to poor balance and function
- Assessments of postural stability, gait, and other functional should be included in an effective fall prevention program in individuals with DPN population

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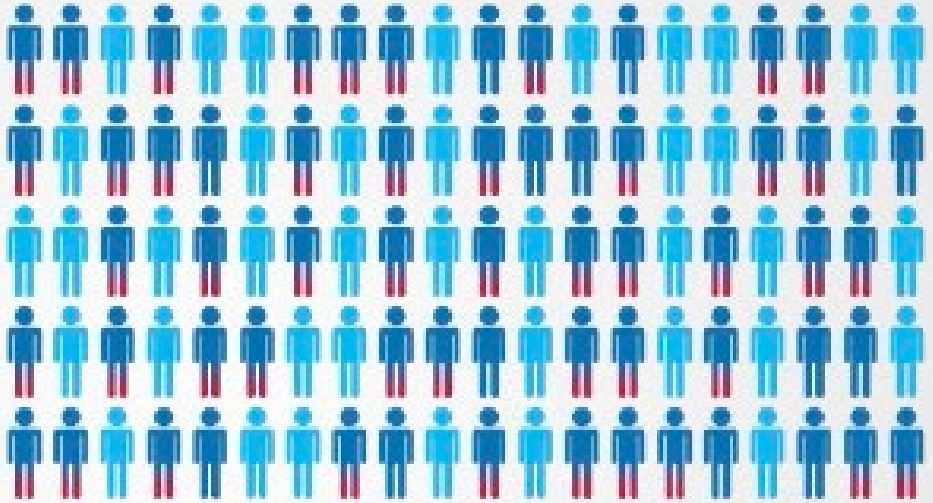
# Advanced DPN Complications

## Diabetic foot ulcers

# Foot Problems' Incidence



**80%**

of diabetic patients have peripheral diabetic neuropathy.[1]

D-Foot International. Accessed November 29, 2022. https://d-foot.org/diabetic-foot/diabetic-foot-facts.

# DPN – Can Hurt Badly

## Amputations, death

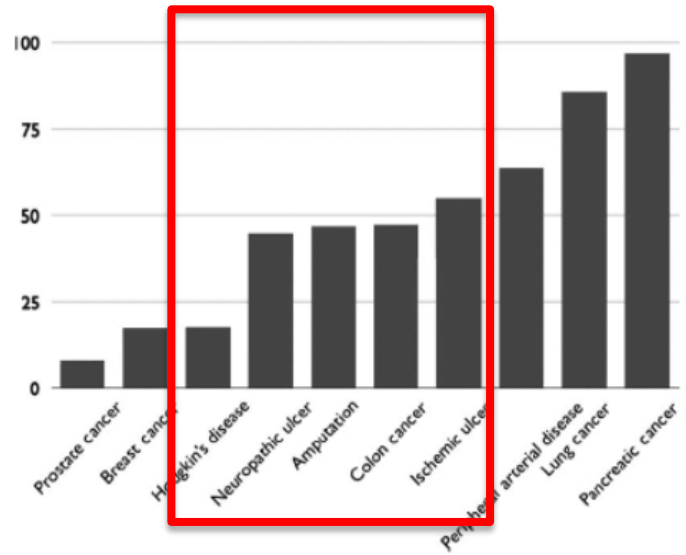
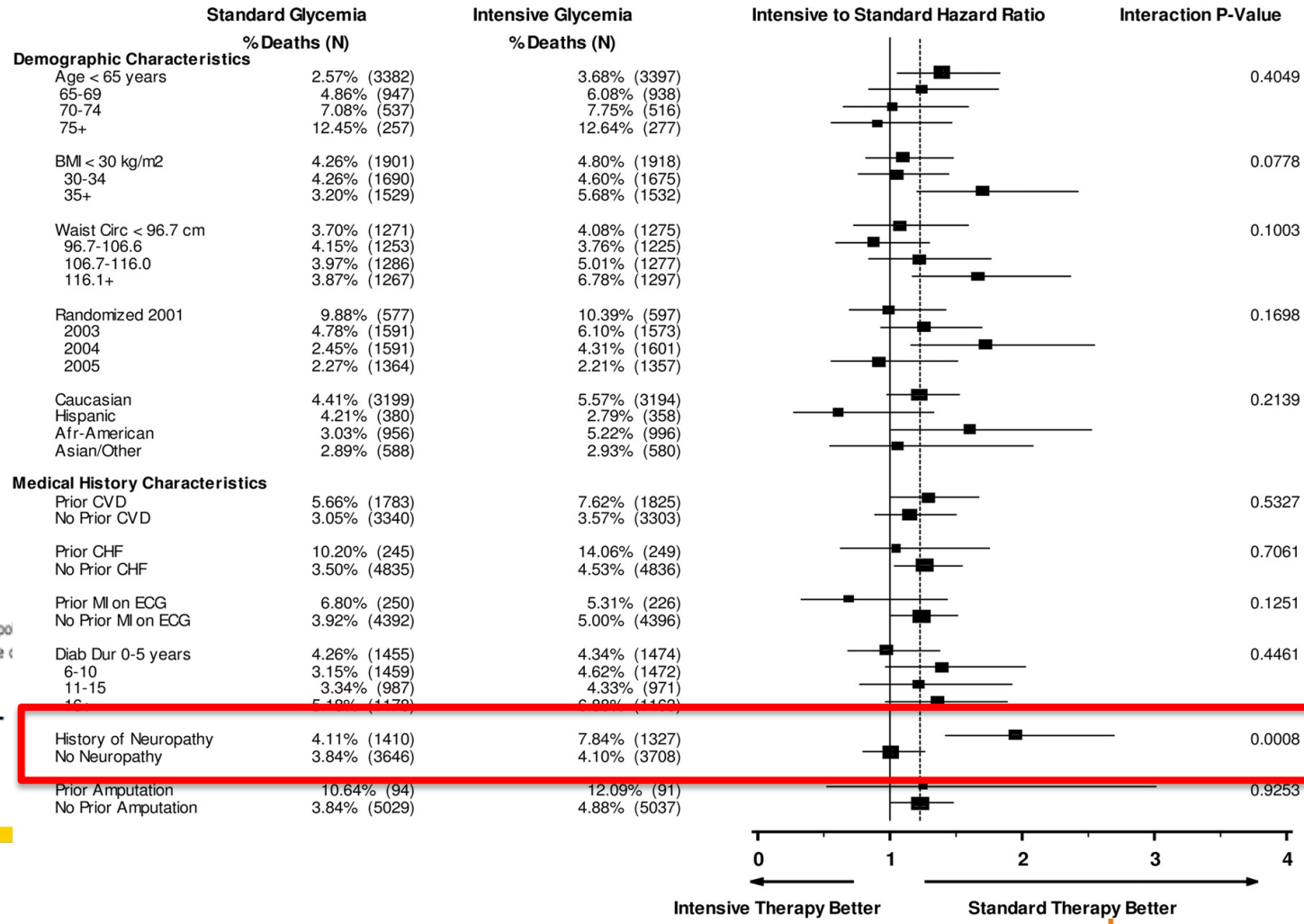



**Figure 1.** Five-year mortality (%). Perhaps now is the time to change our discussion with health-care administrators, poli and especially ourselves. The disease state that many of us treat routinely is, quite literally, killing our patients at a rate ( to cancer. Addressing this issue aggressively may alter this and make a difference for millions of people worldwide.

Armstrong DG, Wrobel JS, Robbins JM. Are diabetes-related wounds and amputations worse than cancer? *IWJ*, 2007; 4(4) 286-7

## 10,000 T2D ACCORD




Calles-Escandón J, et al. *Diabetes Care*. 2010;33(4):721-7.

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# Small Fibers and Clinical Care Impact

**Small Myelinated**

**Unmyelinated fibers**

## Nerve Function

- Nociception (pain and temperature)
- Protective sensations

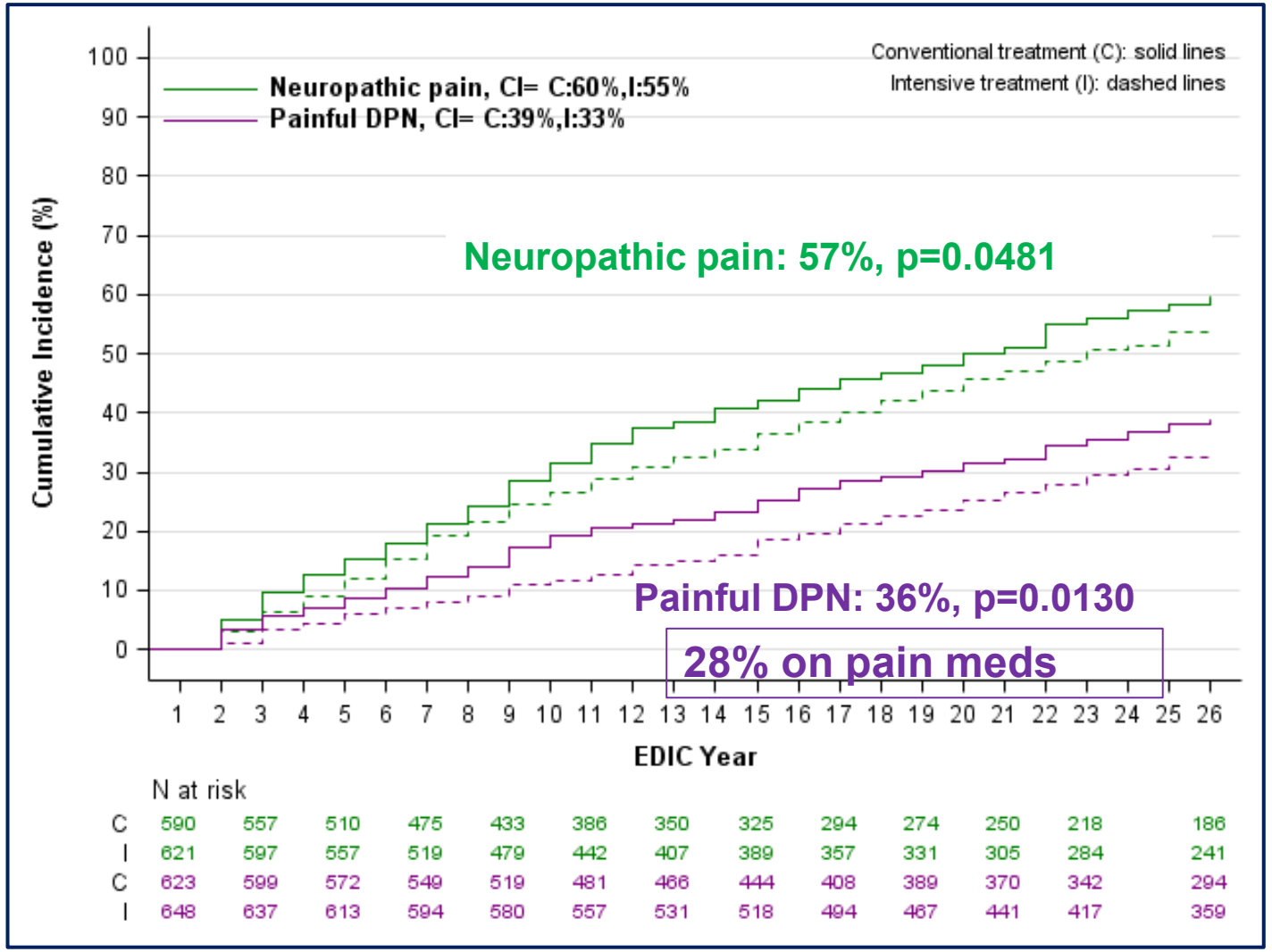
Pop-Busui R, et al. *Diabetes Care*. 2017;40(1):136-154.

# Painful DPN Is Prevalent

**Neuropathic pain**

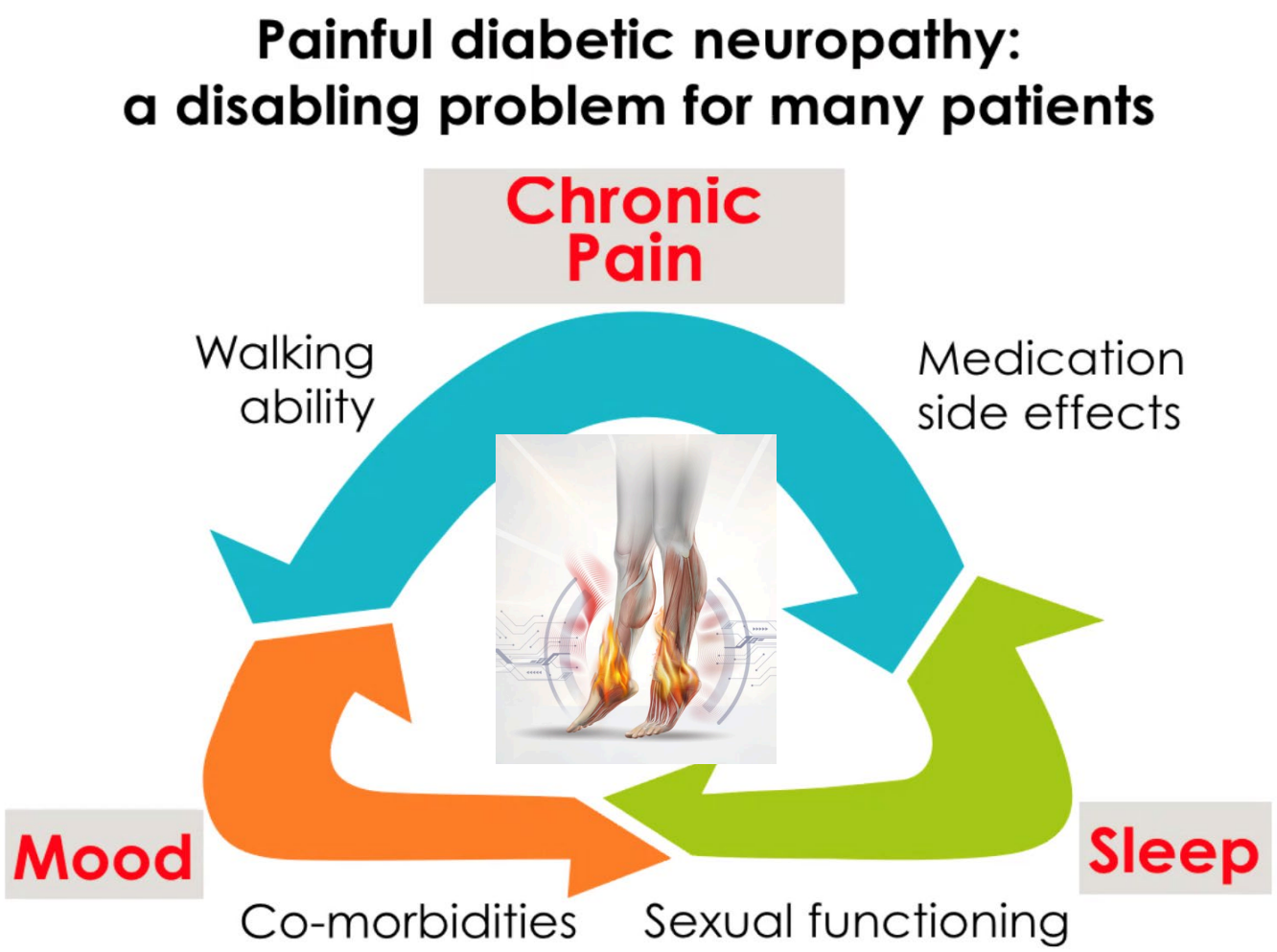
Q2: “Do you ever have any burning pain in your legs and/or feet?”

Q6: “Does it hurt when the bed covers touch your skin?”




Braffet, et al. Presented at: NEURODiab EASD; September 15-18, 2022; Bergen, Norway.

# What One Can't Feel Can Hurt – Painful DPN




## Patient reported outcomes – Quality of Life

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# Painful DPN – A Serious Challenge

european journal of neurology
the official journal of the european academy of neurology

*European Journal of Neurology* 2010, **17:** 1113–1123 doi:10.1111/j.1468-1331.2010.02999.x

EFNS GUIDELINES

## EFNS guidelines on the pharmacological treatment of neuropathic pain: 2010 revision

N. Attal[a,b], G. Cruccu[a,c], R. Baron[a,d], M. Haanpää[a,e], P. Hansson[a,f], T. S. Jensen[a,g] and T. Nurmikko[a,h]

NeuPSIG recommendations

Lancet Neurol 2015; 162-73

## Pharmacotherapy for neuropathic pain in adults: a systematic review and meta-analysis

Nanna B Finnerup*, Nadine Attal*, Simon Haroutounian, Ewan McNicol, Ralf Baron, Robert H Dworkin, Ian Gilron, Maija Haanpää, Per Hansson, Troels S Jensen, Peter R Kamerman, Karen Lund, Andrew Moore, Srinivasa N Raja, Andrew S C Rice, Michael Rowbotham, Emily Sena, Philip Siddall, Blair H Smith, Mark Wallace

CONSENSUS STATEMENT

## Pharmacological management of chronic neuropathic pain: Revised consensus statement from the Canadian Pain Society

DE Moulin MD, A Boulanger MD, AJ Clark MD, H Clarke MD PhD, T Dao DMD PhD, GA Finley MD, A Furlan MD PhD, I Gilron MD MSc, A Gordon MD, PK Morley-Forster MD, BJ Sessle MDS PhD, P Squire MD, J Stinson RN PhD, P Taenzer PhD, A Velly DDS PhD, MA Ware MD, EL Weinberg MD, OD Williamson MBBS

DIABETES RESEARCH AND CLINICAL PRACTICE 186 (2022) 109063


Review

## Screening, diagnosis and management of diabetic sensorimotor polyneuropathy in clinical practice: International expert consensus recommendations

Dan Ziegler[a,b,*], Solomon Tesfaye[c], Vincenza Spallone[d], Irina Gurieva[e,f], Juma Al Kaabi[g,h], Boris Mankovsky[i], Emil Martinka[j,k], Gabriela Radulian[l], Khue Thy Nguyen[m], Alin O Stirban[n], Tsvetalina Tankova[o], Tamás Varkonyi[p], Roy Freeman[q], Péter Kempler[r], Andrew JM Boulton[s]

## Diabetic Neuropathy: A Position Statement by the American Diabetes Association

Rodica Pop-Busui,[1] Andrew J.M. Boulton,[2] Eva L. Feldman,[3] Vera Bril,[4] Roy Freeman,[5] Rayaz A. Malik,[6] Jay M. Sosenko,[7] and Dan Ziegler[8]

Diabetes Care 2017;40:136–154 | DOI: 10.2337/dc16-2042

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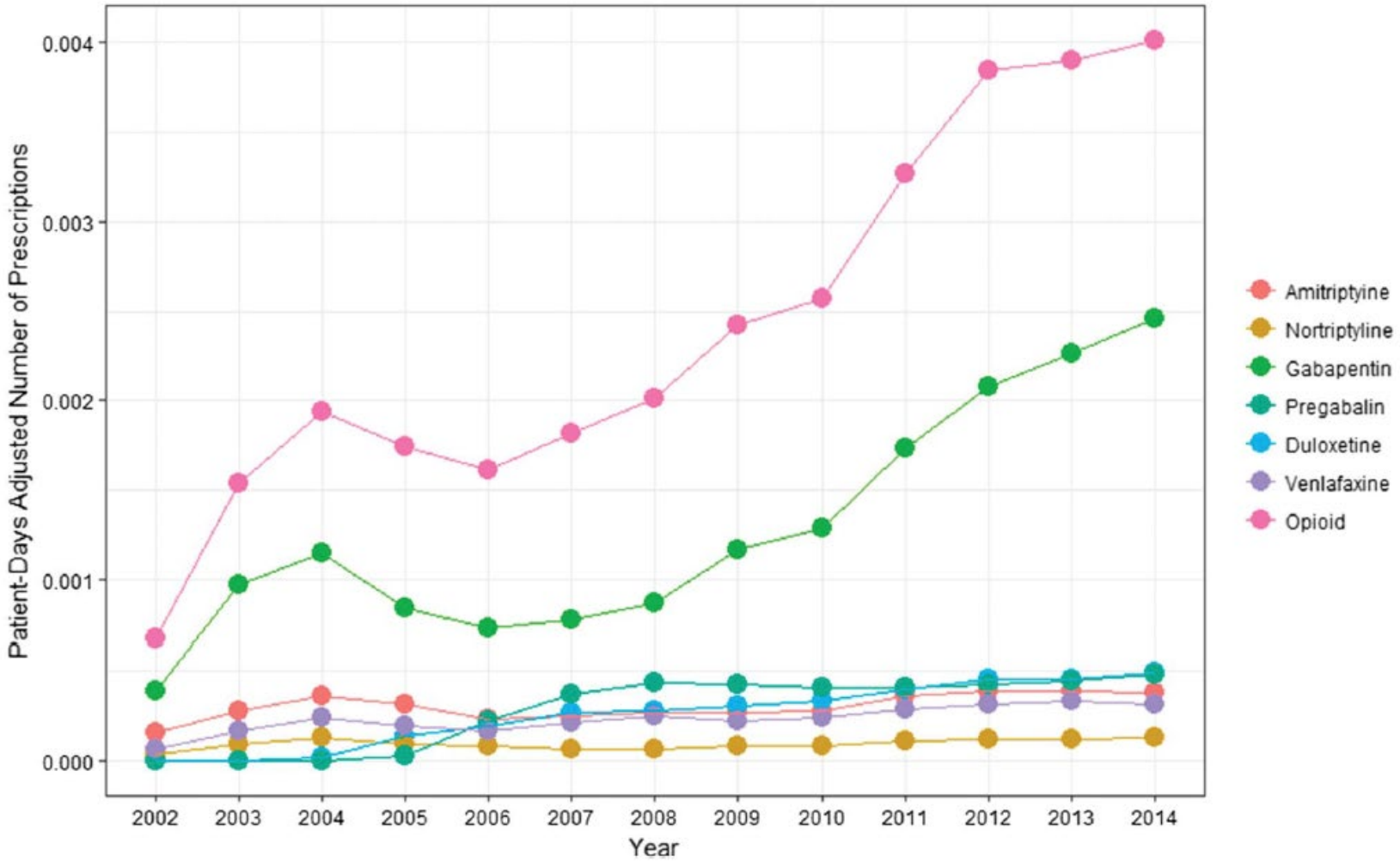
# Painful DPN – A Serious Challenge

| Drug | Drug Class | Dose | | Number Needed to Treat* |
|---|---|---|---|---|
| | | Initial | Effective | |
| Pregabalin** | Anticonvulsant | 25-75 mg, 1-3x daily | 300-600 mg/day | 3.3-7.7 |
| Duloxetine** | Antidepressant | 20-30 mg/day | 60-120 mg/day | 3.8-11 |
| Gabapentin | Anticonvulsant | 100-300 mg, 1-3x daily | 1800-3600 mg/day | 3.3-7.2 |
| Amitryptyline/ Tricyclics | Antidepressant | 10-25 mg daily | 25-100 mg/day | 2.1-4.2 |

**Adapted from Pop-Busui R, et al. *Diabetes Care*. 2017;40(1):136-154.**

# Opioid Use for Neuropathy Pain Is Increasing




Callaghan BC, et al. *Pain*. 2019;160(3):592-599.

# Opioid-Related Death: A New Health Care Challenge and Burden

HEALTH

**A grim tally soars: More than 50,000 overdose deaths in US**

ASSOCIATED PRESS / DECEMBER 9, 2016

The US Food and Drug Administration (FDA) this week announced a new plan to refocus its efforts on curbing opioid-related deaths.

There were 18 893 deaths involving prescription opioids in the US in 2014, up 16% from 2013, according to the National Center for Health Statistics (NCHS). The administration believes synthetic opioids contributed to the increase in prescription opioid-related deaths. Deaths

ntanyl and tramadol

m 2013-2014.

There were 18 893 deaths involving prescription opioids in the US in 2014.

American Journal of Case Reports

Received: 2017.04.05
Accepted: 2017.05.11
Published: 2017.07.21

ISSN 1941-5923
© Am J Case Rep, 2017; 18: 817-821
DOI: 10.12659/AJCR.904695

## Cardiac Arrest Following Drug Abuse with Intravenous Tapentadol: Case Report and Literature Review

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABDEF 1 Misbahuddin Khaja
ACD 2 George Lominadze
ABCDF 2 Konstantin Millerman

1 Department of Medicine (Pulmonary and Critical Care Medicine), Bronx-Lebanon Hospital Center Affiliated with Icahn School of Medicine at Mount Sinai, Bronx, NY, U.S.A.
2 Division of Critical Care Medicine, New York Presbyterian-Lawrence Hospital Center Affiliated with Columbia University College of Physician and Surgeons, Bronxville, NY, U.S.A.

- **Up to 28-33% of patients receive an opioid as a first-line agent for painful DPN**

Patil PR, et al. *Clin J Pain.* 2015;31(5):414-24. Hoffman EM, et al. *JAMA Neurology.* 2017;74(7):773-79. Khaja M, et al. *Am J Case Reports.* 2017;18:817-821.

# Prescription of Opioids and Mortality in Patients with Chronic Non-cancer Pain

Table 3. Mortality According to Underlying Cause of Death

| Deaths | Anticonvulsant or Cyclic Antidepressant (Person-Years of Follow-up = 8066) | | Long-Acting Opioid (Person-Years of Follow-up = 11 070) | | Adjusted Hazard Ratio (95% CI)[a] | Adjusted Risk Difference (95% CI)[a,b] | *P* Value |
|---|---|---|---|---|---|---|---|
| | Deaths | Incidence per 10 000 Person-Years | Deaths | Incidence per 10 000 Person-Years | | | |
| All | 87 | 107.9 | 185 | 167.1 | 1.64 (1.26 to 2.12) | 68.5 (28.2 to 120.7) | <.001 |
| Out-of-hospital | 60 | 74.4 | 154 | 139.1 | 1.90 (1.40 to 2.58) | 67.1 (30.1 to 117.3) | <.001 |
| Unintentional overdose[c] | 7 | 8.7 | 34 | 30.7 | 3.37 (1.47 to 7.70) | 20.6 (4.1 to 58.1) | .004 |
| Other causes | 53 | 65.7 | 120 | 108.4 | 1.72 (1.24 to 2.39) | 47.4 (15.7 to 91.4) | .001 |
| Cardiovascular | 36 | 44.6 | 79 | 71.4 | 1.65 (1.10 to 2.46) | 28.9 (4.6 to 65.3) | .02 |
| Respiratory | 3 | 3.7 | 10 | 9.0 | 3.00 (0.81 to 11.09) | 7.4 (−0.7 to 37.5) | .10 |
| Other injury | 11 | 13.6 | 19 | 17.2 | 1.15 (0.54 to 2.47) | 2.1 (−6.3 to 20.0) | .72 |
| Other | 3 | 3.7 | 12 | 10.8 | 3.72 (1.04 to 13.30) | 10.1 (0.2 to 45.7) | .04 |
| Hospital | 27 | 33.5 | 31 | 28.0 | 1.00 (0.59 to 1.69) | 0 (−13.6 to 23.1) | >.99 |

[a] Adjusted for baseline propensity score decile, age, and calendar year during follow-up.

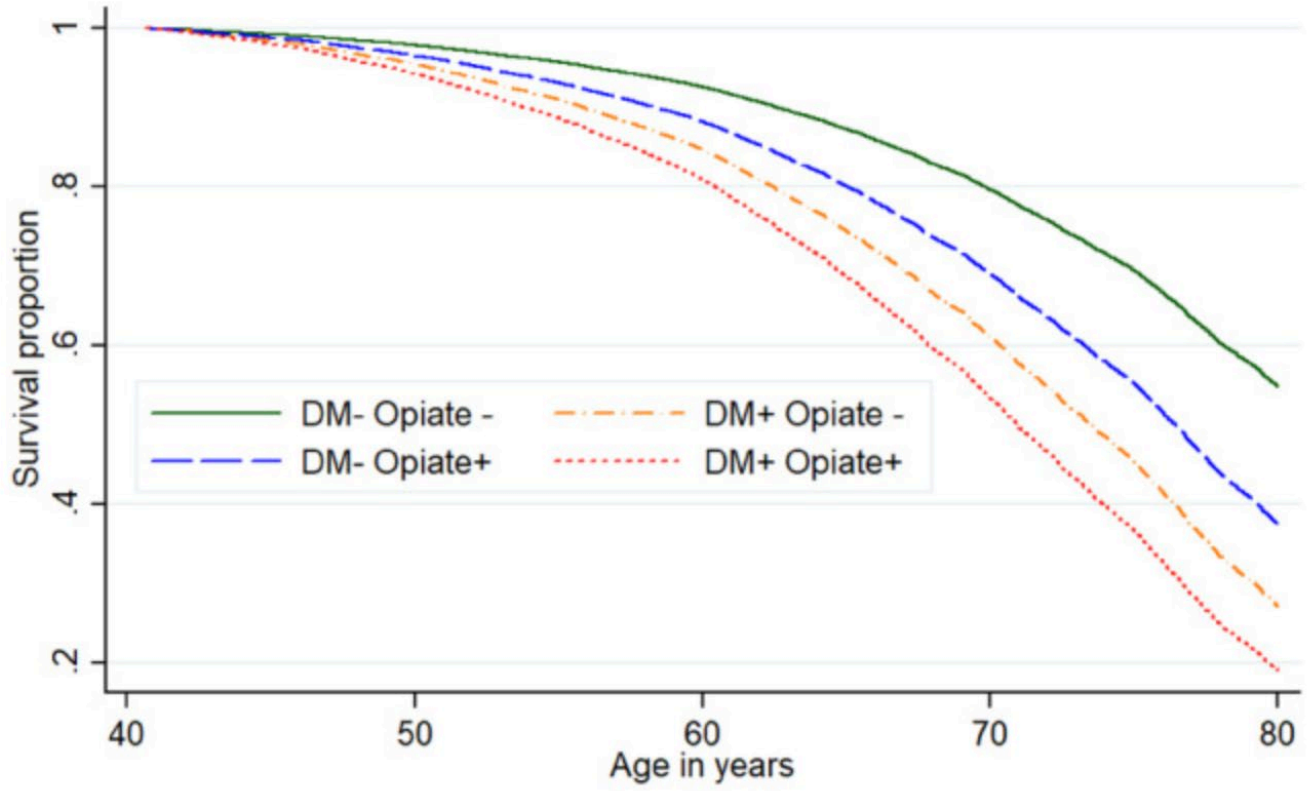
[b] Risk differences for the specific causes of death do not sum because the regression model parameters are estimated separately for each cause.

[c] The cohort excluded patients with a diagnosis of or procedure for treatment of substance abuse other than nicotine or alcohol as well as those prescribed buprenorphine. Because such patients would plausibly have increased risk of overdose, overdose mortality in the study cohort is likely to be lower than that in a more general patient population.

**Ray WA, et al. *JAMA*. 2016;315(22):2415-23.**

# Opiate Use and Mortality Among People With and without Diabetes

50 045 people—aged 40–75, 28 811 women, 8487 opiate users, 3548 diabetic patients—were followed during a median of 11.1 years, with over 99% success follow-up




**Nalini M, et al. *Int J Epidemiol*. 2021;50(1):314-324.**

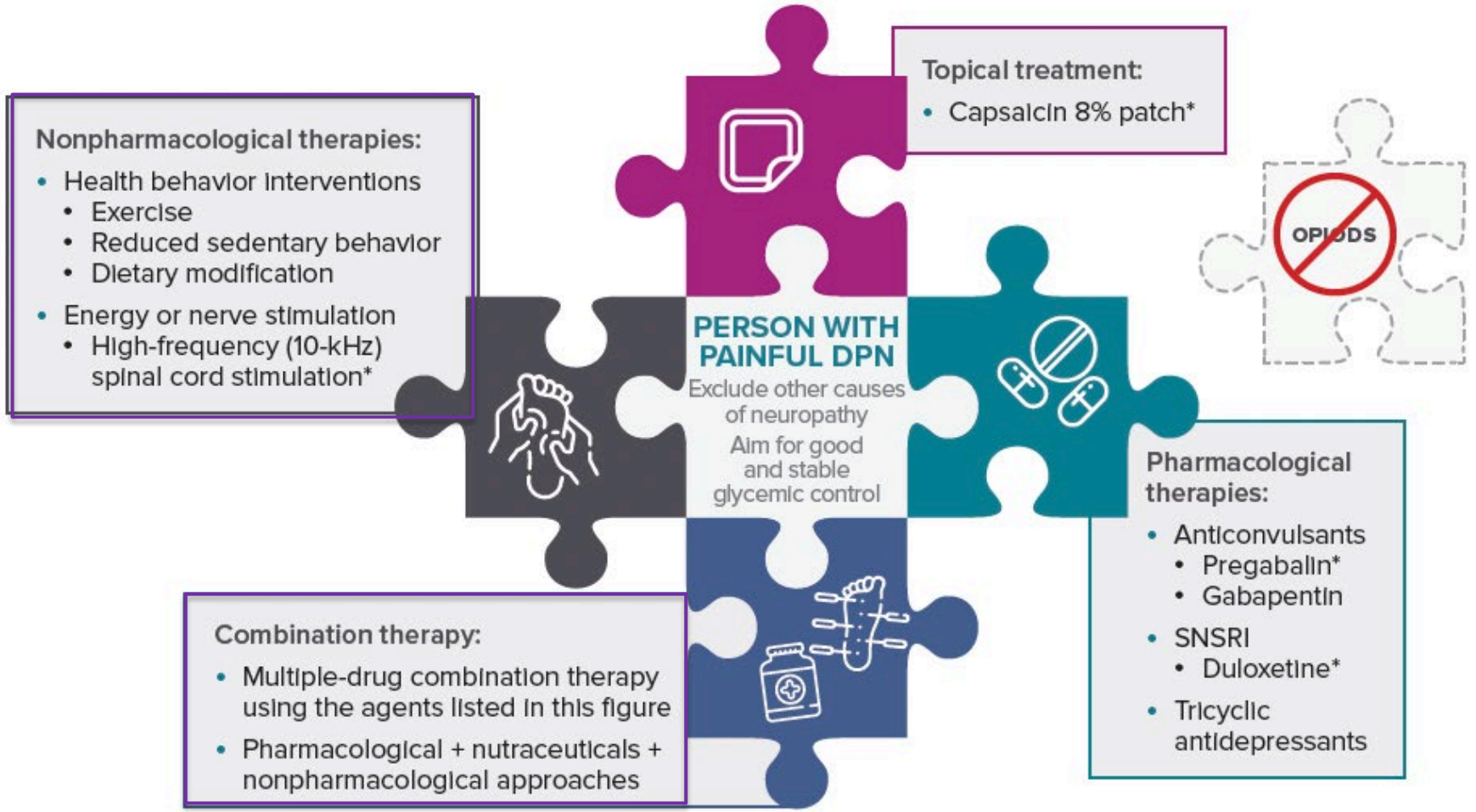
# Opioid Therapy, Adverse Outcomes, and Mortality Among Patients with Polyneuropathy

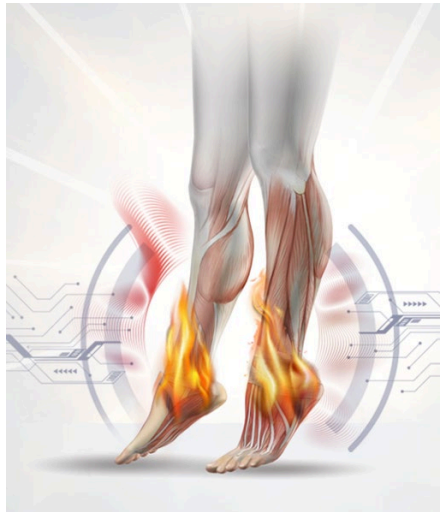
## Population-based cohort 2006-2016

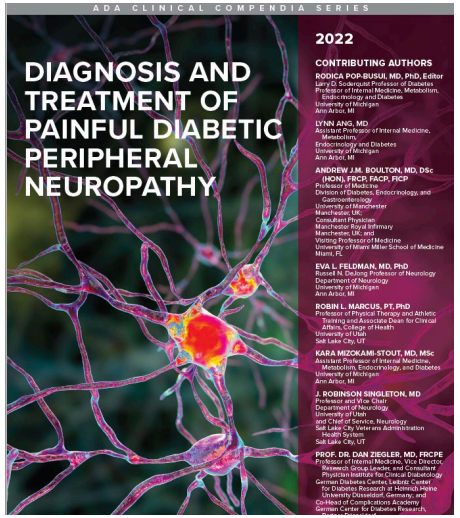
| Adverse Outcome | Opioid Treatment, No. (%) | | HR (95% CI) | Adjusted HR (95% CI) |
|---|---|---|---|---|
| | <90 d (n = 1452) | ≥90 d (n = 541) | | |
| Depression | 633 (43.6) | 341 (63.0) | 1.97 (1.68-2.30) | 1.53 (1.29-1.82) |
| Abuse | | | | |
| Alcohol | 109 (7.5) | 54 (10.0) | 1.63 (1.10-2.39) | 1.38 (0.90-2.11) |
| Opioid | 2 (0.1) | 9 (1.7) | 10.66 (2.71-70.27) | 3.97 (0.87-28.9) |
| Other substance | 27 (1.9) | 25 (4.6) | 2.37 (1.29-4.36) | 1.81 (0.92-3.58) |
| Overdose | | | | |
| Opioid | 4 (0.3) | 14 (2.6) | 8.29 (2.93-29.44) | 5.12 (1.63-19.62) |
| Other substance | 24 (1.7) | 22 (4.1) | 2.53 (1.37-4.65) | 1.82 (0.92-3.6) |
| Dependence | | | | |
| Opioid | 20 (1.4) | 39 (7.2) | 5.59 (3.20-10.18) | 2.85 (1.54-5.47) |
| Other substance | 129 (8.9) | 95 (17.6) | 2.41 (1.73-3.34) | 1.73 (1.21-2.49) |
| Deceased by 11/25/16 | 530 (36.5) | 256 (47.3) | 1.22 (1.05-1.41) | 0.99 (0.84-1.16) |

Hoffman EM, et al. *JAMA Neurol*. 2017;74(7):773-779.

# Algorithm for Treatment of Pain in DPN






Pop-Busui R, et al. *Diagnosis and Treatment of Painful Diabetic Peripheral Neuropathy*. American Diabetes Association; 2022.

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# Summary:
# What You Can't Feel Can Hurt You

- The DPN associated nerve damage and loss lead to
  - Loss of sensation
  - Loss of balance
  - Loss of daily function
  - Increased risk for falls and fractures
  - Ulcers, amputations
  - Severe neuropathic pain
    - Polypharmacy, costs, side effects, dependance
    - Anxiety, depression, lack of sleep
  - Death


# Thank you!

## Research Participants!

## All collaborators: Michigan and worldwide!



https://medicine.umich.edu/dept/intmed/divisions/metabolism-endocrinology-diabetes/research/clinical-research/program-clinical-research-diabetes-care-complications

Great Debates & Updates | Diabetic Foot

# Debate: Diabetic Peripheral Neuropathy What You Can't Feel Can Hurt You

- Nothing to debate here, right?...

**Dr Crystal Holmes**

- Is our neuropathy messaging working?
- Screening tool – why are we not using?
- Are we considering social determinants of health in our neuropathy work up, treatment plans and future discoveries for neuropathy?

# Neuropathy Messaging

Are we asking the right questions & giving the correct feedback to patients?

## Get the pressure off your foot ulcer with offloading devices:

- **Offloading devices** are what you wear on your foot **and** what you use to help you get around.
- Too much pressure causes ulcerations.
- 85% of diabetic foot and leg amputations are caused by a foot ulcer.
- The longer your foot ulcer stays open, the greater your risk is for infection and amputation.
- The more pressure you get off your foot ulcer, the faster it will heal.
- If you do not get the pressure off your foot ulcer it may never heal.
- **Work with your doctor to get the right foot gear and assistive device to heal your ulcer today!**



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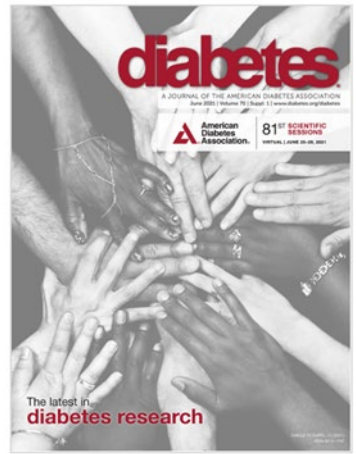



OR: FOOT CARE—LOWER EXTREMITIES | JUNE 01 2021


### 267-OR: Assessing Patient Knowledge about Diabetic Foot Ulcer Offloading FREE


REBECCA A. BURMEISTER; CRYSTAL HOLMES; CHRISTINE JAROCKI; TYSON STROM; GARNEISHA M. TORRENCE; BRIAN M. SCHMIDT





*Diabetes* 2021;70(Supplement_1):267-OR

https://doi.org/10.2337/db21-267-OR

**Patient Version**

**MICHIGAN NEUROPATHY SCREENING INSTRUMENT**

**A. History** (To be completed by the person with diabetes)

Please take a few minutes to answer the following questions about the feeling in your legs and feet. Check yes or no based on how you usually feel. Thank you.

| | | |
|---|---|---|
| 1. | Are you legs and/or feet numb? | ☐ Yes ☐ No |
| 2. | Do you ever have any burning pain in your legs and/or feet? | ☐ Yes ☐ No |
| 3. | Are your feet too sensitive to touch? | ☐ Yes ☐ No |
| 4. | Do you get muscle cramps in your legs and/or feet? | ☐ Yes ☐ No |
| 5. | Do you ever have any prickling feelings in your legs or feet? | ☐ Yes ☐ No |
| 6. | Does it hurt when the bed covers touch your skin? | ☐ Yes ☐ No |
| 7. | When you get into the tub or shower, are you able to tell the hot water from the cold water? | ☐ Yes ☐ No |
| 8. | Have you ever had an open sore on your foot? | ☐ Yes ☐ No |
| 9. | Has your doctor ever told you that you have diabetic neuropathy? | ☐ Yes ☐ No |
| 10. | Do you feel weak all over most of the time? | ☐ Yes ☐ No |
| 11. | Are your symptoms worse at night? | ☐ Yes ☐ No |
| 12. | Do your legs hurt when you walk? | ☐ Yes ☐ No |
| 13. | Are you able to sense your feet when you walk? | ☐ Yes ☐ No |
| 14. | Is the skin on your feet so dry that it cracks open? | ☐ Yes ☐ No |
| 15. | Have you ever had an amputation? | ☐ Yes ☐ No |

Total: _____

**MICHIGAN NEUROPATHY SCREENING INSTRUMENT**

**B. Physical Assessment** (To be completed by health professional)

1. Appearance of Feet

| | **Right** | **Left** |
|---|---|---|
| a. Normal | ☐ 0 Yes ☐ 1 No | Normal ☐ 0 Yes ☐ 1 No |
| b. If no, check all that apply: | | If no, check all that apply: |
| Deformities | ☐ | Deformities ☐ |
| Dry skin, callus | ☐ | Dry skin, callus ☐ |
| Infection | ☐ | Infection ☐ |
| Fissure | ☐ | Fissure ☐ |
| Other | ☐ | Other ☐ |
| specify: _____ | | specify: _____ |

| | **Right** | | | **Left** | | |
|---|---|---|---|---|---|---|
| 2. Ulceration | Absent ☐ 0 | | Present ☐ 1 | Absent ☐ 0 | | Present ☐ 1 |
| 3. Ankle Reflexes | Present ☐ 0 | Present/ Reinforcement ☐ 0.5 | Absent ☐ 1 | Present ☐ 0 | Present/ Reinforcement ☐ 0.5 | Absent ☐ 1 |
| 4. Vibration perception at great toe | Present ☐ 0 | Decreased ☐ 0.5 | Absent ☐ 1 | Present ☐ 0 | Decreased ☐ 0.5 | Absent ☐ 1 |
| 5. Monofilament | Normal ☐ 0 | Reduced ☐ 0.5 | Absent ☐ 1 | Normal ☐ 0 | Reduced ☐ 0.5 | Absent ☐ 1 |

Signature:_____ Total Score _____ /10 Points




# Why is not used in clinical care ?

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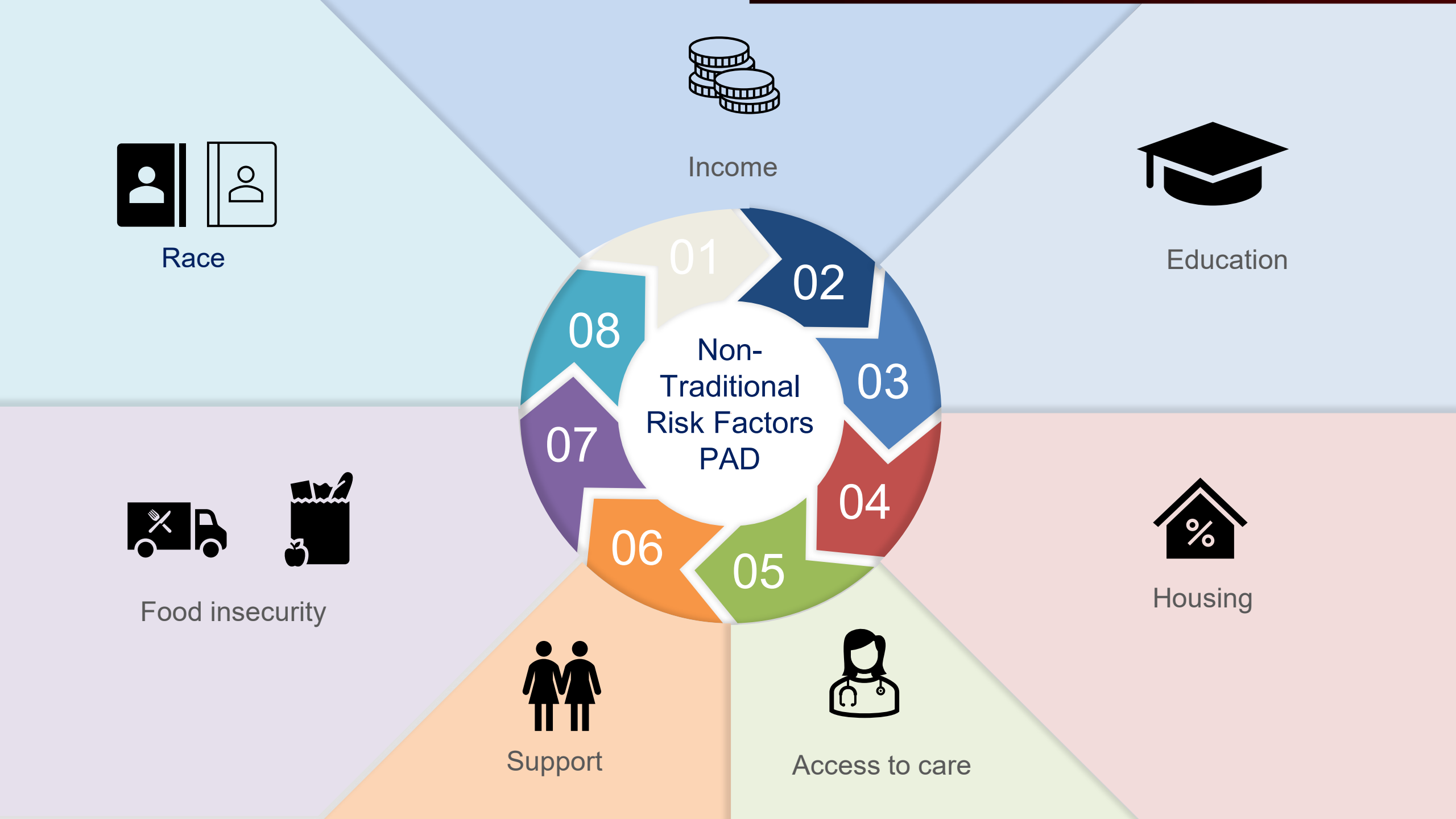
# Debate & dialogue: Social determinants of health & diabetic neuropathy


Income
Race
Education
Non-Traditional Risk Factors PAD
01
02
03
04
05
06
07
08
Food insecurity
Housing
Support
Access to care

# Non-Traditional Risk Factors DPN : Social Determinants of Health

**T1D Exchange Cohort**

>25,000 T1D

**Characteristics of Participants with and without DPN**

| | MNSIq-DPN | Non-MNSIq DPN | P-value |
|---|---|---|---|
| Income ≥75,000 | 38% | 59% | N/A* |
| ≥Bachelor's Degree | 54% | 68% | <0.001 |
| Private Insurance | 58% | 83% | <0.001 |

*Correlated with insurance and education level, not included in the multivariate analysis.

**Scottish Cohort**

>100,000 T1D

SDRNT1BIO
SCOTTISH DIABETES RESEARCH NETWORK TYPE 1 BIORESOURCE

**Individuals who lived in more deprived areas had significantly higher odds of having DPN than those living in less deprived areas: OR 2.61 [95% CI 2.21–3.08]- adjusted for age, sex, and diabetes duration,**

**Multiple adjustments this association remained : OR 2.17 [95% CI 1.78–2.65]**

Mizokami-Stout K, et al. *Diabetes Care.* 2020:43(4):806-812. Jeyam A, et al. *Diabetes Care.* 2020;43:734-742.

# Socioeconomic position (SEP) is strongly associated with DFU outcomes

## Predictors of amputation in people with DFUs

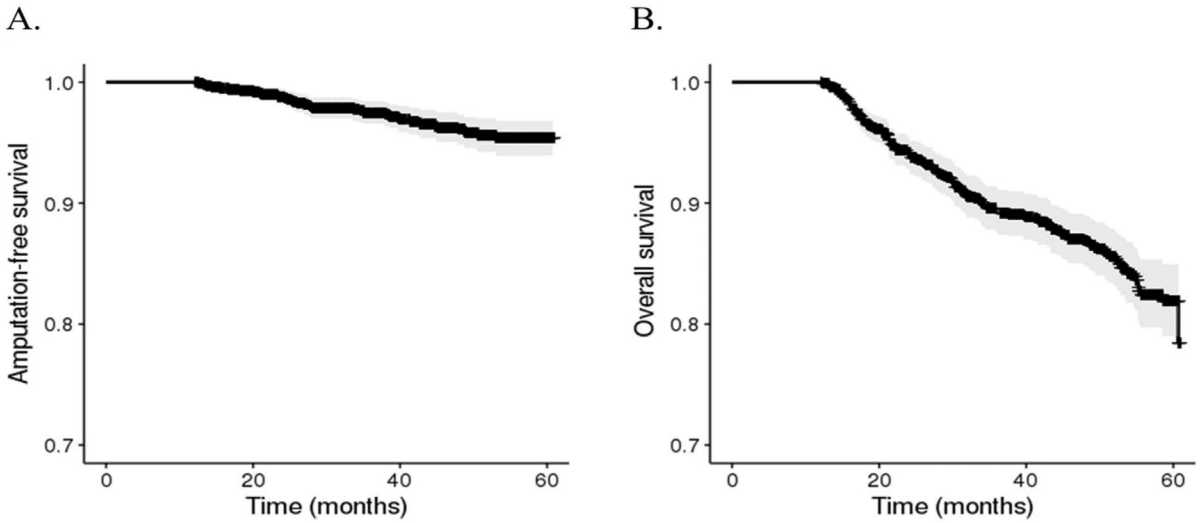
- **Low SEP (HR 5.13; *p* = 0.018),**
- Male sex (hazard ratio [HR], 2.41; *p* < 0.01),
- Circulatory complications (HR 2.14; *p* = 0.020
- Ophthalmopathy (HR, 1.89; *p* = 0.028),

## Predictors of Mortality in people with DFUs

- **Low SEP (HR 2.65; *p*< 0.01)**
- Circulatory complications (HR: 1.74; p<0.01
- Older age (HR: 1.06)

Fig. 2

From: Association between socioeconomic position and diabetic foot ulcer outcomes: a population-based cohort study in South Korea




Kaplan-Meier plots for (**a**) amputation-free survival and (**b**) overall survival of patients with diabetic foot ulcers

Ha JH, et al. *BMC Public Health*. 2021;21(1):1395.

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# Thank You to my Team

**Diabetic Foot Consortium:**

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# Thank You