Reducing therapeutic inertia in type 2 diabetes

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Background
Therapeutic inertia describes a failure to establish appropriate treatment targets and escalate treatment to achieve those targets. This inertia can be measured, and evidence of this inertia is present in approximately one-third of diabetes management consultations. This inertia describes a failure in the system to produce change, rather than assigning fault to the physician or patient.

Objective
This article discusses the importance of reducing therapeutic inertia in type 2 diabetes and focusing on reducing overall cardiovascular risk.

Discussion
This article discusses approaches to reducing treatment inertia in type 2 diabetes (ie identify the problem, get permission, set goals, measure progress and alter treatment to reach those goals). The treat-to-target methodology, the STABLE (Smoking cessation, Target organ involvement, HbA1c, Blood pressure, Lipid profile, Energy balance) acronym and practical approaches are described.

OVER 1.3 MILLION AUSTRALIANS were identified as living with diabetes in 2021.[1] Diabetes can be described as a progressive disease characterised by premature cardiovascular morbidity and mortality.[2] Therapeutic inertia describes the failure to establish appropriate targets and escalate treatment to achieve treatment goals.[2] It is also called clinical or treatment inertia. The inertia describes the failure in a system to produce change, rather than assigning fault to the physician or patient. This article discusses approaches to reducing therapeutic inertia in diabetes, namely identify the problem, get permission, set goals, measure progress and alter treatment to reach those goals. Treat-to-target methodology, the STABLE (**S**moking cessation, **T**arget organ involvement, Hb**A**1c, **B**lood pressure, **L**ipid profile, **E**nergy balance) acronym, and practical approaches are highlighted.

Identify the problem: Therapeutic inertia

Diabetes conforms to the 'rule of halves', the worldwide observation that for most common chronic diseases, half of those with the condition are diagnosed/identified, half of those identified are treated and, of those treated, half are treated to target (ie have reached evidence-based goals).[3,4] A major factor is therapeutic inertia. Therapeutic inertia exists for a condition when the healthcare worker and/or patient recognises that relevant evidence-based guidelines and health targets exist; believes the guidelines/targets apply; and has the resources to apply the guidelines, yet treatment is not escalated to reach those targets, or the targets are not changed.[5]

Some of the reasons for failing to reach evidence-based targets are that targets have not been set or agreed, progress has not been measured, treatment has not been escalated, the patient has not adhered to treatment (or adverse effects from treatment prevent adherence) or the treatment is unaffordable. Non-judgemental questioning can identify the barriers to reaching evidence-based goals. Systemic factors affecting therapeutic inertia include a low expectation of efficacy or benefit, poor understanding of the value of reaching targets, a lack of targets being identified and agreed and not intending to adhere to the interventions.[2,6,7]

These factors can affect all parties. Half the patients with chronic disease do not use medicines as prescribed.[8] Physicians do not adhere to general guidelines up to 70% of the time.[9] Physicians are also aware of the principle of 'first do no harm', which can lead to preferring the status quo. Despite this context, adhering to agreed medications reduces mortality/morbidity (relative risk of all-cause mortality 0.72[10]) and overall costs

to the health system (increased medication costs, decreased acute care costs). When escalation of treatment does not bring expected change, 75% of the time it is because of medication non-adherence.[11] The exception is when oral diabetic agents are no longer sufficient, and insulin or glucagon peptide-1 receptor agonists (GLP-1 RA) are required. In one Japanese study, 50% of patients had elevated HbA1c no matter how many oral hypoglycaemic agents they took.[12] Healthcare workers often overestimate the difficulty of insulin use and underestimate the usefulness of education in adding insulin to treatment.[13] Multidisciplinary team members (accessed via the chronic disease management plan [CDMP]) can be a significant support. To initiate insulin, one approach is to add insulin as a subcutaneous long-acting (basal) insulin dose of 0.1 units/kg or 10 units once daily (continuing oral medications),[14] knowing that the total amount of insulin the body requires daily is highly variable, but roughly 0.6 units/kg.[15] The insulin should be taken at the same time each day, and can be increased by 2–4 units every three to seven days until targets are reached (see below). It commonly takes two to four months to reach glycaemic targets.[15]

Get permission: The patient-centred approach

A patient-centred approach is central to several international diabetes guidelines.[14,16–18] Targets and treatments are negotiated, including the order in which they are reached. Subgoals can be set, allowing incremental achievement. There is firm evidence that control of cardiovascular risk factors in diabetes significantly decreases microvascular and macrovascular complications, and failure to reach targets increases morbidity and mortality.[19–21] Although both are important, there is evidence patients value effective communication even more than shared decision making.[8] Informed consent of treatment requires adequate information to make decisions. Health literacy cannot be assumed: the *National health survey: health literacy* found that, among Australian adults, a significant number reported difficulty understanding health information (8%), navigating the health system (14%) and appraising health information (17%).[22]

Set goals and measure progress: The treat-to-target process

A concept of 'glycaemic burden' exists; that is, the number of months/years with elevated HbA1c. A legacy effect exists, with added benefit for good glycaemic control within the first six months after diagnosis.[23] Reaching glycaemic targets early leads to decreased risk of microvascular disease, myocardial infarction and death from any cause.[24]

The treat-to-target process is iterative and builds on the therapeutic relationship. International, Australian and local guidelines are available, indicating evidence-based targets for treatment.[14–18] Targets are negotiated and documented. They should be as SMART (**s**pecific, **m**easurable, **a**chievable, **r**ealistic and **t**ime defined) as possible. A challenge in type 2 diabetes (T2D) is that the guidelines can be complex and change. A summary of current general guidelines is provided in Table 1 and useful resources are included in Table 2. The guidelines form a basis to select and document personalised targets. Digital apps and dashboards can assist patients. Social media can give incorrect dietary and lifestyle advice, and consideration of including a dietitian, diabetes nurse educator and exercise physiologist in the CDMP is warranted.

The challenge to many chronic diseases is that reaching target is not indicated by resolution of symptoms. Long-term adherence ('persistence') is one treatment goal.[8] Treating to target is an active process that involves:

- problem definition ('Why is this symptom/sign a problem?')
- gaining informed consent for treatment ('Let's treat this problem')
- setting mutually agreed treatment goals ('This is what you need to achieve, and by when'), which can be incremental
- treatments to achieve these goals ('This is a step in reaching your goals')
- measuring progress ('This is where you are')
- adjust treatment or goal ('Let's make this change to reach your goals').

When applied to T2D, the process might look like the following:

- Problem definition: There is consistent strong evidence that smoking cessation, control of HbA1c, blood pressure and low-density lipoprotein cholesterol significantly reduces macrovascular and microvascular complications and mortality. Conversely, a delay in treatment escalation leads to increased cardiovascular events.[19]
- Informed consent: Interventions to reach therapeutic targets have associated costs involving time, effort, and finance. Setting appropriate goals through information sharing, clinical perspective, and buy-in can be done over several visits and is no different from the management of other conditions.
- Setting treatment goals: Treatment goals should be simple, clear and evidence based. For T2D targets, the STABLE acronym can be used (described below).
- Treatments to achieve goals: Treatment involves identification of the patient's perspective (ideas, concerns, expectations) and negotiation of the type of lifestyle modification, medications, referrals, monitoring and review.
- Measuring progress: This should lead to action on the results at every visit.

Treating a condition is an active process, with regular adjustment of the treatment or goals. In diabetes, treatment of several factors multiplies benefit. Targets should be evidence based, informed by current guidelines and ethical, influenced by the principles of beneficence, autonomy, non-maleficence, justice and openness/transparency/privacy. The elephant in the room is that autonomy means sometimes patients do not want to do certain things. It is better to be open about realistic goals, and clear about the rationale for each target. Targets can be changed if they are not being achieved.

Alter treatment in real life: One approach

Any approach must be realistic. Patients can have several pressing needs for a consultation. Patients can book an appointment for an acute condition, yet also need diabetes medicines. People can have different expectations for the consultation – 'Just a refill of the medicines, Doc'. One real-life approach is described below:

- Decide whether diabetes management is necessary in this consultation (or reschedule for another appointment).

Table 1. Diabetes targets

Risk factor	General target[14] (unless indicated)[A]
Smoking	• No tobacco products or e-cigarettes • Consider referral to a structured program if smoking[24]
Target organ involvement:	
• Eyes	• Retinopathy screening at diagnosis then every 1–2 years
• Kidneys	• Nephropathy screening at diagnosis, then UACR annually; aim for <2.5 mg/mmol (<22 mg/g) in men and <3.5 mg/mmol (<31 mg/g) in women • Offer ACEi or ARB if UACR elevated • Offer SGLT2 inhibitor if UACR >30 mg/mmol (>265 mg/g)[24]
• Nerves	• Neuropathy screening at time of diagnosis, then annually • Check temperature or pin-prick (small nerve fibre) and vibration (large nerve fibre) using a 128-Hz tuning fork • Annual 5.01 (10 g) monofilament light pressure test[23] • Foot check each visit if neuropathy is present
• Immune system, including vaccination status (influenza and routine adult vaccinations)	• Yearly influenza vaccination • Vaccinate for pneumococcus, Tdap
HbA1c, blood glucose level	• Measure HbA1c every 3–6 months until stable, then every 6 months • HbA1c generally ≤7%; consider ≤6% if not using medicines, ≤7.5% if older adult, ≤8% if predicted survival <10 years or severe hypoglycaemic episodes[22] • Fasting and preprandial blood glucose level 4–7 mmol/L • Postprandial blood glucose level 5–10 mmol/L • For self-monitoring of blood glucose if taking insulin, or hyperglycaemia from intercurrent illness, or HbA1c unreliable (eg haemoglobinopathies)
Blood pressure	• No hypertension: measure at least annually[24] • If hypertensive, aim for ≤140/90 mmHg (Note that in an older person, it might be difficult to get blood pressure <145 mmHg systolic if stiff vessels are present[22]) • If hypertensive, aim for ≤130/80 mmHg if CKD also present

Table continued on the next page

- Explain we all have five targets for health (no smoking; good sugar, blood pressure, lipid levels; and a healthy diet, body mass index, activity level) and at each visit we will concentrate on one goal, until all are achieved.
- Find one target that is being achieved and highlight. Recognise the healthy habits already in place. By definition, every patient has at least one healthy habit in place (they turned up to the consultation!).
- Suggest one intervention towards achieving the other health targets (eg get a blood test, look up the Dietary Approaches to Stop Hypertension [DASH] diet for hypertension, increase activity levels, book a CDMP). Most laboratory tests in someone already diagnosed with T2D can be non-fasting, unless significant hypertriglyceridaemia is present (>4.5 mmol/L).[25] A trial of 1:1:1 can occur (ie make one intervention in one patient to be reviewed after one visit).
- Advise when the next appointment is appropriate, with any tests/referrals needed before the visit ordered.

Results should be acted upon, otherwise treatment inertia will occur. Assessment of progress can be cumulative (at each visit) and/or summative (eg annual CDMP). Assessment can measure outcome (reaching targets), process (eg referrals organised and attended, laboratory tests performed) or balance (what are the unintended costs and/or side effects of treatment [eg hypoglycaemia, erectile dysfunction, nausea, weight gain with smoking cessation] and are they justified by the result?).

As physicians, we should be aware of our biases: we overestimate the quality of care we provide and the hardship to the patient, while underestimating the proportion of our patients not at target and the importance of patient education.[7,12] Patient advice should be linked to real-world data. For example, in counselling for smoking cessation, the average weight gain six years after smoking cessation was 3.2 kg in one study,[26] which can be used during discussion and motivate action towards healthy diet and exercise levels.

STABLE acronym

Most people with diabetes die from atherosclerotic cardiovascular disease (ASCVD). Risk factors for ASCVD are interactive and multiplicative, and mild

Table 1. Diabetes targets (cont'd)

Risk factor	General target[14] (unless indicated)[A]
Lipid profile	• As per Medicare guidelines. Aim for: – Total cholesterol <4 mmol/L – HDL-C ≥1 mmol/L – LDL-C <2 mmol/L (<1.8 mmol/L if established ASCVD) – TG <2 mmol/L • Calculate ASCVD risk (fasting not necessary) – If ASCVD risk ≥10%, consider initiating atorvastatin 20 mg for primary prevention[24] – If ASCVD risk ≥20%, consider adding ezetimibe to reduce LDL-C by ≥50% if target not achieved by statin • Moderate-intensity statins reduce LDL-C 30–40% • High-intensity statins reduce LDL >40% • Avoid grapefruit with statins[24]
Energy balance:	
• Current weight (BMI)	• BMI ≥25 kg/m^2: 5–10% weight loss • BMI ≥27 kg/m^2: consider anti-obesity medications[22] • BMI ≥40 kg/m^2, or ≥35 kg/m^2 with comorbidities or with diabetes <10 years:[24] consider bariatric surgery
• Diet	• Diet as per Australian dietary guidelines (see resources). ≤2 standard drinks alcohol per day with 2 days alcohol free per week
• Exercise/activity (per week)	• Exercise: ≥150 minutes per week moderate-intensity exercise (eg brisk walk, golf, lawn mowing) or ≥75 minutes per week vigorous-intensity activity (eg jogging, football), including muscle-strengthening activities on two days per week[16]
Other	• Screening for depression • If using a statin, order LFT on commencement, then at 6 months (unless dosage changes) If ALT raised, check for fatty liver or liver fibrosis[23]

[A]RACGP article reference unless otherwise indicated.

ACEi, angiotensin-converting enzyme inhibitor; ALT, alanine transaminase; ARB, angiotensin receptor blocker; ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; CKD chronic kidney disease; HDL-C high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; LFT, liver function test; SGLT2, sodium–glucose cotransporter 2; TG, triglycerides; UACR, urine albumin-to-creatinine ratio; Tdap, tetanus, diphtheria, acellular pertussis.

elevations still convey risk.[27] The STABLE acronym lists clinical targets in a simplified form, allowing rapid assessment of current progress. Although checklists and templates exist, having a simple mnemonic allows focus on what needs to change at this visit. The acronym is as follows:

Smoking cessation

Target organ involvement: eyes, kidneys, nerves and immune system (vaccine status)

A1c: HbA1c

Blood pressure

Lipid profile

Energy balance: current weight, energy input (diet) and output (physical activity); alcohol can be a hidden cause of excess energy consumption.

Vaccine status is included in the STABLE acronym, because T2D is associated with reduced immunocompetence. Tasks can be shared between the multidisciplinary treatment team, but relevant results need to be available at the time a treatment decision is made.

Conclusion

In conclusion, we have discussed therapeutic inertia and approaches to reduce it, including identifying the barriers to reaching evidence-based goals, getting permission to individualise targets and the order they are reached, setting goals and measuring progress by treating to target and altering treatment to reach those goals. Failure to achieve goals should be documented, including contributing factors, and further referral considered. Escalation of treatment can be tried, reassessed at the next visit and altered, adopted or abandoned. The STABLE acronym describes the key targets to be reviewed each visit (rather than just annually), and adjustments should be made at each visit when indicated. Current targets and useful resources are listed in Tables 1 and 2.

Key points

- T2D is a chronic disease and requires a patient-centred approach to manage.
- Clinical targets should be agreed, documented and reviewed.
- The treat-to-target strategy approach can be implemented with each prescription renewal.
- Focus on HbA1c, low-density lipoprotein and blood pressure initially.

Table 2. Useful resources

Diagnosis of type 2 diabetes	www.diabetes.org.uk/professionals/position-statements-reports/diagnosis-ongoing-management-monitoring/new_diagnostic_criteria_for_diabetes
ASCVD risk calculator	www.guidelinecentral.com/calculators/2c9e8038734e3c9e0173534463af000e
Medication choices	www.nps.org.au/australian-prescriber/articles/second-steps-in-managing-type-2-diabetes
De-escalation strategies	https://deprescribing.org/wp-content/uploads/2018/08/AHG-deprescribing-algorithms-2018-English.pdf
Health professional resources	www.diabetesaustralia.com.au/health-professional-resources
Patient education resources:	
Diabetes	www.diabetesaustralia.com.au/diabetes-fact-sheets
Dietary recommendations	www.diabetesaustralia.com.au/wp-content/uploads/healthy-eating-for-adults.pdf
Exercise/activity recommendations	www.health.gov.au/topics/physical-activity-and-exercise/physical-activity-and-exercise-guidelines-for-all-australians/for-adults-18-to-64-years
Quality improvement resources	www.ihi.org

ASCVD, atherosclerotic cardiovascular disease.

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References

1. Australian Institute of Health and Welfare. Diabetes: Australian facts. Australian Government, 2023. Available at www.aihw.gov.au/reports/diabetes/diabetes/contents/summary# [Accessed 23 September 2023].
2. Strain WD, Cos X, Hirst M, et al. Time to do more: Addressing clinical inertia in the management of type 2 diabetes mellitus. Diabetes Res Clin Pract 2014;105(3):302–12. doi: 10.1016/j.diabres.2014.05.005.
3. Sainsbury E, Shi Y, Flack J, Colagiuri S. The diagnosis and management of diabetes in Australia: Does the 'rule of halves' apply? Diabetes Res Clin Pract 2020;170:108524. doi: 10.1016/j.diabres.2020.108524.
4. Hart JT. Rule of halves: Implications of increasing diagnosis and reducing dropout for future workload and prescribing costs in primary care. Br J Gen Pract 1992;42(356):116–19.
5. Reach G, Pechtner V, Gentilella R, Corcos A, Ceriello A. Clinical inertia and its impact on treatment intensification in people with type 2 diabetes mellitus. Diabetes Metab 2017;43(6):501–11. doi: 10.1016/j.diabet.2017.06.003.
6. Khunti K, Wolden ML, Thorsted BL, Andersen M, Davies MJ. Clinical inertia in people with type 2 diabetes: A retrospective cohort study of more than 80,000 people. Diabetes Care 2013;36(11):3411–17. doi: 10.2337/dc13-0331.
7. Strain WD, Blüher M, Paldánius P. Clinical inertia in individualising care for diabetes: Is there time to do more in type 2 diabetes? Diabetes Ther 2014;5(2):347–54. doi: 10.1007/s13300-014-0077-8.
8. Bosworth HB. The importance of considering clinical inertia and implementation science when addressing medication adherence. JAMA Netw Open 2020;3(10):e2020233. doi: 10.1001/jamanetworkopen.2020.20233.
9. Barth JH, Misra S, Aakre KM, et al. Why are clinical practice guidelines not followed? Clin Chem Lab Med 2016;54(7):1133–39. doi: 10.1515/cclm-2015-0871.
10. Karam SL, Dendy J, Polu S, Blonde L. Overview of therapeutic inertia in diabetes: Prevalence, causes, and consequences. Diabetes Spectr 2020;33(1):8–15. doi: 10.2337/ds19-0029.
11. Carls GS, Tuttle E, Tan RD, et al. Understanding the gap between efficacy in randomized controlled trials and effectiveness in real-world use of GLP-1 RA and DPP-4 therapies in patients with type 2 diabetes. Diabetes Care 2017;40(11):1469–78. doi: 10.2337/dc16-2725.
12. Maegawa H, Ishigaki Y, Langer J, Saotome-Nakamura A, Andersen M; Japan Diabetes Clinical Data Management (JDDM) Study Group. Clinical inertia in patients with type 2 diabetes treated with oral antidiabetic drugs: Results from a Japanese cohort study (JDDM53). J Diabetes Investig 2021;12(3):374–81. doi: 10.1111/jdi.13352.
13. Guzman SJ. A behavioral perspective of therapeutic inertia: A look at the transition to insulin therapy. Diabetes Spectr 2020;33(1):38–43. doi: 10.2337/ds19-0024.
14. The Royal Australian College of General Practitioners (RACGP); Diabetes Australia. Management of type 2 diabetes: A handbook for general practice. RACGP, 2020. Available at www.racgp.org.au/diabetes-handbook [Accessed 24 September 2023].
15. Therapeutic Guidelines. Type 2 diabetes in adults. Available at https://tgldcdp.tg.org.au/viewTopic?etgAccess=true&guidelinePage=Diabetes&topicfile=type-2-diabetes-in-adults&guidelinename=Diabetes&sectionId=toc_d1e47#toc_d1e47 [Accessed 23 September 2023].
16. International Diabetes Federation (IDF). IDF clinical practice recommendations for managing type 2 diabetes in primary care. Available at https://idf.org/what-we-do/education/ [Accessed 24 September 2023].
17. American Diabetes Association. Standards of care in diabetes – 2023 abridged for primary care providers. Clin Diabetes 2022;41(1):4–31. doi: 10.2337/cd23-as01.
18. National Institute for Heath and Care Excellence (NICE). Type 2 diabetes in adults: Management. NICE guideline [NG28]. NICE, 2022. Available at www.nice.org.uk/guidance/ng28 [Accessed 9 November 2023].
19. Paul SK, Klein K, Thorsted BL, Wolden ML, Khunti K. Delay in treatment intensification increases the risks of cardiovascular events in patients with type 2 diabetes. Cardiovasc Diabetol 2015;14(1):100. doi: 10.1186/s12933-015-0260-x.
20. Suzuki R, Kazumori K, Usui T, Shinohara M. Prevalence and predictors of clinical inertia in patients with type 2 diabetes who were treated with a single oral antidiabetic drug. J Diabetes Investig 2023;14(1):81–91. doi: 10.1111/jdi.13923.
21. Heisler M, Bouknight RR, Hayward RA, Smith DM, Kerr EA. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. J Gen Intern Med 2002;17(4):243–52. doi: 10.1046/j.1525-1497.2002.10905.x.

22. Australian Bureau of Statistics (ABS). National health survey: Health literacy. ABS, 2019. Available at www.abs.gov.au/statistics/health/health-conditions-and-risks/national-health-survey-health-literacy/latest-release [Accessed 9 November 2023].
23. Deed G, Barlow J, Kuo I. Early and tight glycaemic control – The key to managing type 2 diabetes. Aust Fam Physician 2012;41(9):681–84.
24. Holman RR, Paul SK, Bethel MA, Matthews DR, Neil HA. 10-Year follow-up of intensive glucose control in type 2 diabetes. N Engl J Med 2008;359(15):1577–89. doi: 10.1056/NEJMoa0806470.
25. Tse T, Wu B, Willcock S, Vagholkar S. Non-fasting lipids: A change in practice. Aust J Gen Pract 2022;51(5):381–82. doi: 10.31128/AJGP-10-21-6194.
26. Yatsuya H. Avoid clinical inertia: Importance of asking and advising patients with diabetes who smoke about quitting. J Diabetes Investig 2021;12(3):317–19. doi: 10.1111/jdi.13421.
27. Phillips LS, Twombly JG. It's time to overcome clinical inertia. Ann Intern Med 2008;148(10):783–85. doi: 10.7326/0003-4819-148-10-200805200-00011.

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