

Type Two Diabetes Mellitus Prescribing in New Zealand - What are we dispensing?

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Type 2 Diabetes in NZ: The Numbers

- 250,000 patients estimated in NZ
- Māori and Pacific 3-6 times the rate of Type 2 Diabetes 40 to 60 age group compared European
 - Mortality rates 40 to 70 years of age, x7 the rate in European
 - Progression to ESRF x7 rate in European
- 11% Vote Health
- Major and growing health issue NZ

Type 2 Diabetes in NZ

1. Māori and Pacific people bear a disproportionate burden of T2DM-related disease
2. Contributing to ethnic health disparities in NZ.
3. Effective management of T2DM is critical for reducing the disease-related complications.

NZ Guidelines Recommendations

- Target HbA1c of 50-55 mmol/mol
- Tailor treatment to the individual: lifestyle interventions + medication
- Antidiabetic agents available (NZ): include:
 - metformin, sulfonylureas (glibenclamide, gliclazide, glipizide), acarbose, pioglitazone and insulin.

NZ Guidelines Recommendations

The recommended sequence of care in **NZ** :

1. Lifestyle interventions (eg. exercise, dietary changes)
2. Pharmacological therapies.
 - I. Metformin's first-line pharmacological agent
 - II. Addition of sulfonylurea if required
 - III. Insulin

International guidelines support the use of metformin as a first-line agent:

- relatively inexpensive
- established safety profile
- possible cardiovascular protection
- no weight gain

NZ versus International

In contrast with the NZ recommendations,

- American and European guidelines support tailoring the choice of second-line therapy to the individual

Many of the agents recommended in these international guidelines are not funded in NZ:

- a) sodium-glucose cotransporter-2 (SGLT2) inhibitors (\$90/month)
- b) dipeptidyl peptidase-4 (DPP-4) inhibitors (\$110/month)
- c) glucagon-like peptide-1 (GLP-1) receptor agonists (\$220/month)

Study Rational

1. A number of international studies have considered prescribing patterns of antidiabetic agents
2. Using National Pharmaceutical Collection database:
 - I. Describes the pattern of first- and second-line anti-diabetic dispensing (a proxy for prescribing patterns) for T2DM in NZ
 - II. To assess the degree of adherence by prescribers with treatment guidelines.

How? First Line Dispensing

- Patients identified from **Pharmaceutical Collection** database
- **Collected first dispensing** for metformin, sulfonylureas, other funded anti-diabetics (acarbose and pioglitazone) +/- insulin
- Nine financial years **2007/08 to 2015/16**: complete patient identifier data was available.
- Identify T2DM (and not those with Type 1 DM) : just collected insulin and not other anti-diabetic agents were excluded.
- Patient's earliest diabetes medicine dispensing date was identified.

Limitations

- As the Pharmaceutical Collection database does not record indication for medicine the analysis could not distinguish between T2DM and other conditions such as polycystic ovary syndrome (PCO) or Pre-diabetes.
- Assumed that T2DM would be vast majority of this group.

How? Second Line Dispensing

- The dataset for the patients who started diabetes medicine treatment in 2007/08 (the 2007/08 cohort) was used to investigate second-line treatments.
- The cohort was followed up until 2015/16 to see what second line agent was used.

First-line T2DM treatments used in NZ:

Metformin

- Total of **166,016 patients**, avg. **18,446 per year**, were dispensed their first T2DM treatment
- **Metformin** monotherapy was the most commonly dispensed first-line anti-diabetic
- Metformin first line **increased** from 80% in 2007/8 to 85% in 2015/16.

First-line T2DM treatments used in NZ:

Sulfonylurea

- Sulfonylurea monotherapy dispensing **decreased** over the nine years , and in 2015/16 accounted for 2% of all first-line dispensing.

Dual agents

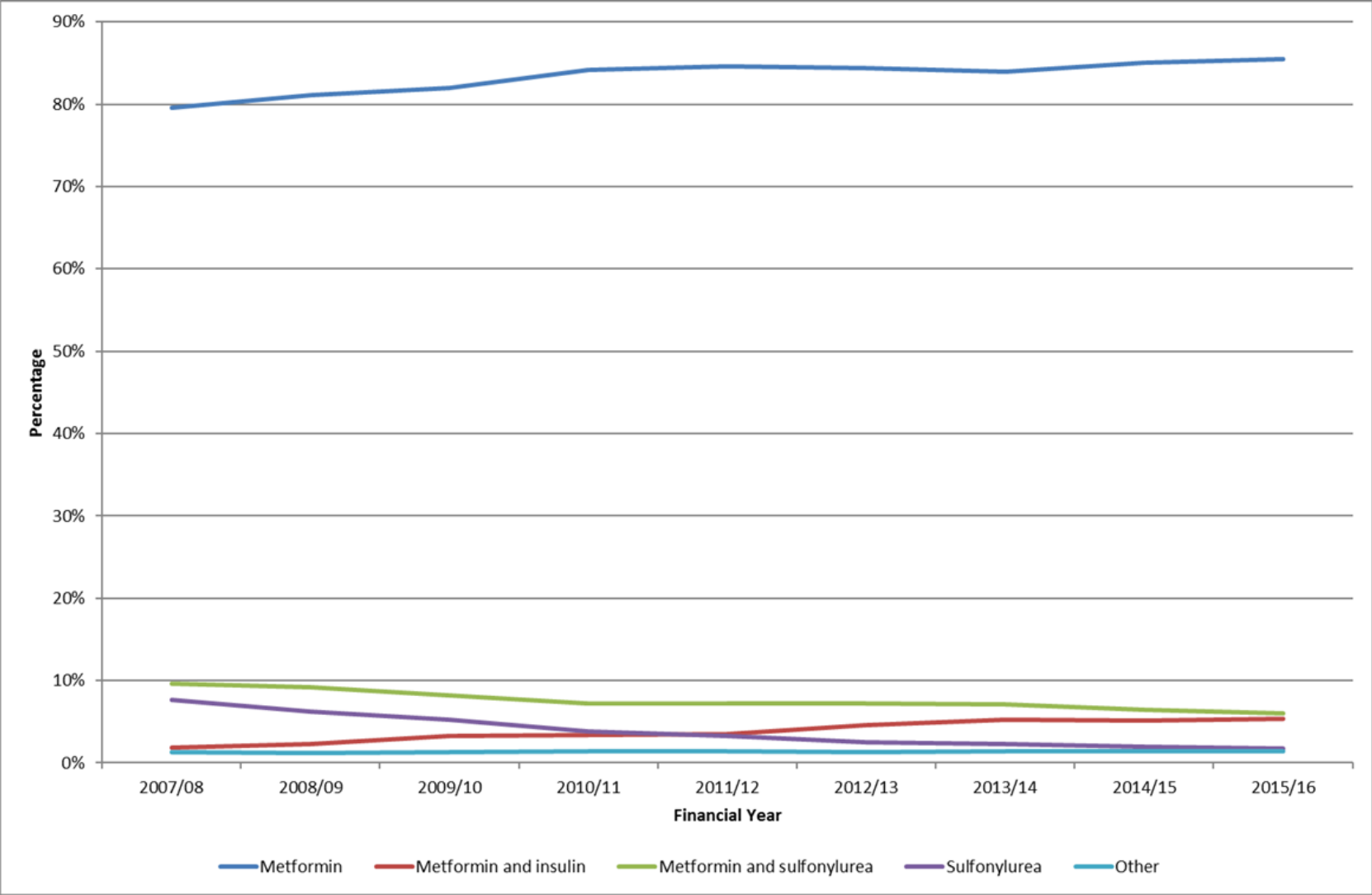
- Dual anti-diabetic therapy (metformin and sulfonylurea) dispensing also trended down over time: 10% to 6%
- Initial dispensing of both metformin and insulin slightly increased over the period analysed: 2% to 5%

First-line T2DM treatments used in NZ:

1% of first-line dispensing each year:

- Acarbose and pioglitazone
- Other combinations (eg. sulfonylurea plus insulin)

First T2DM medication/s dispensed in patients in New Zealand, 2007/08 – 2015/16.

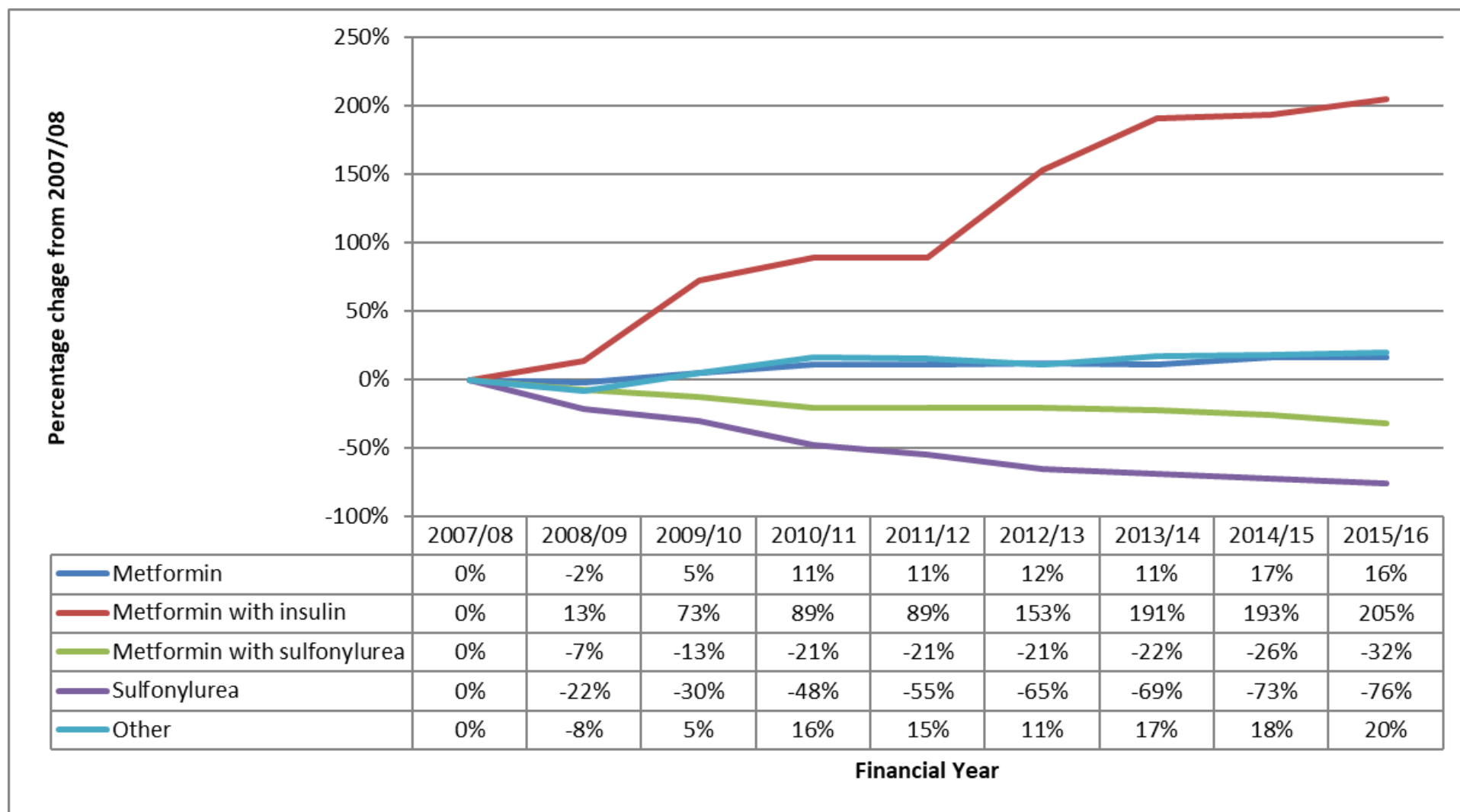


2015/16: First Line Dispensing

Relative to dispensing patterns in 2007/08

- 205% increase in metformin and insulin dispensing
- 76% reduction in sulfonylurea
- 32% reduction in metformin/sulfonylurea dispensing (Figure 2).

Figure 2 – Changes in first T2DM agent dispensed over time relative to 2007/08



Second-line T2DM treatments used in the 2007/8 cohort

- On follow-up, the cohort of patients (N=17,206) who were prescribed their first-line T2DM agent in 2007/2008
 - 46% (N=7,958) received a second-line agent.
- Of those who received a second-line therapy, the main agents dispensed were:
 - sulfonylureas (70%),
 - insulin (14%),
 - metformin (8%)
 - other (8%)
 - Acarbose 2.4%
 - Pioglitazone 3.4%
- When metformin was the first-line agent:
 - 86% were started on a sulfonylurea as a second-line agent (Figure 3).

Figure 2 – Second-line T2DM treatment dispensing for the 2007/8 cohort

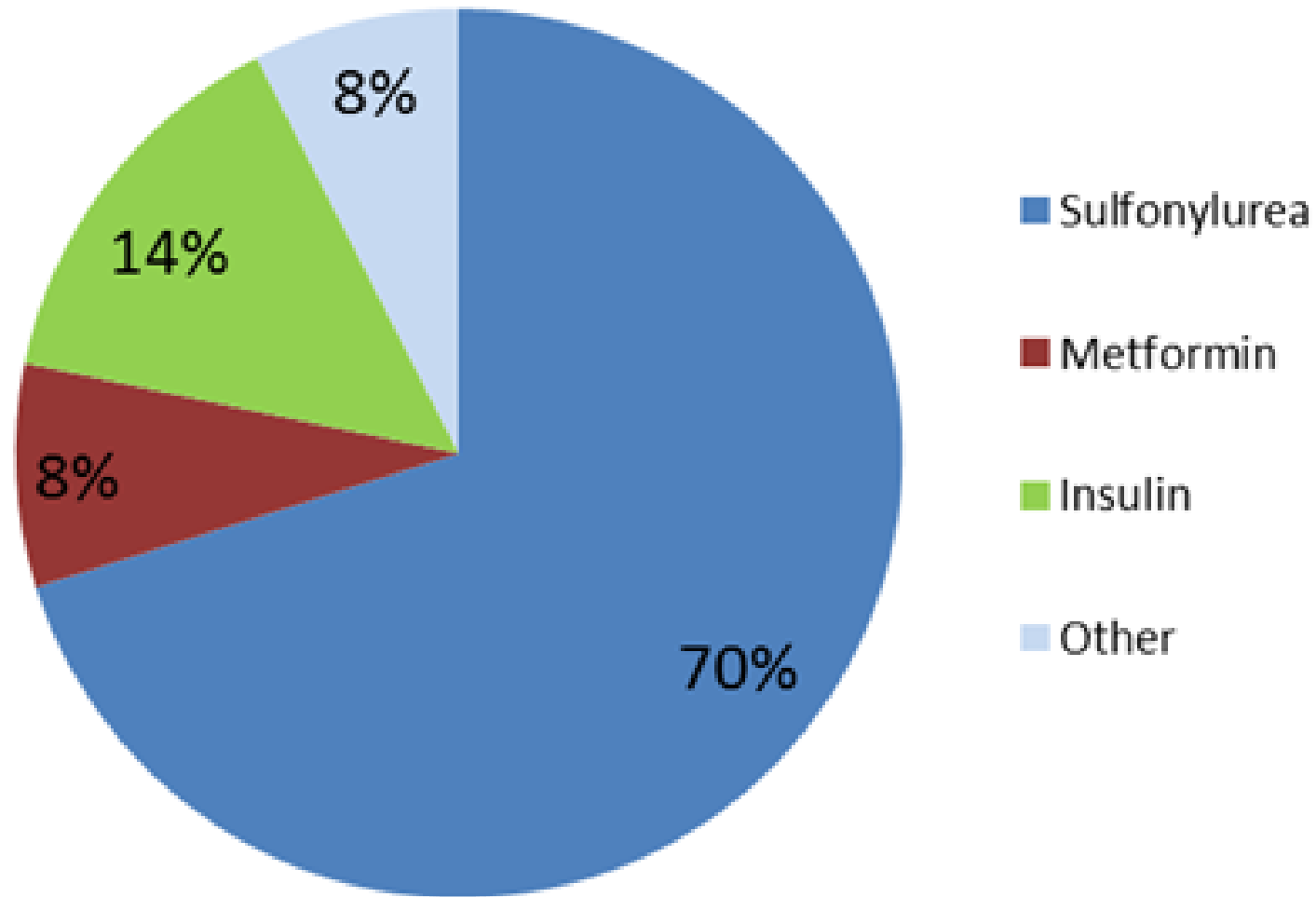
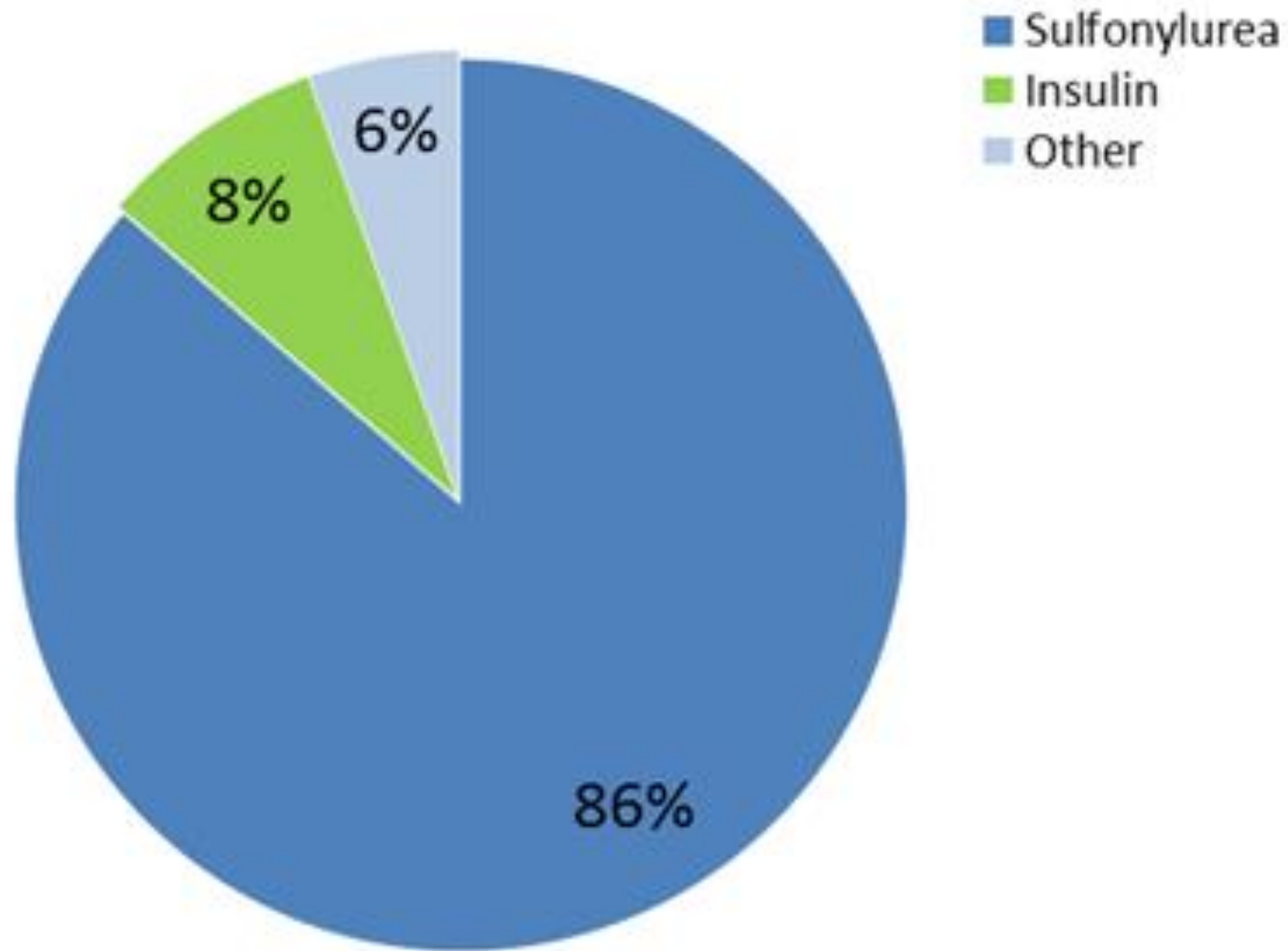


Figure 3 – Second-line T2DM treatment dispensing for the 2007/8 cohort who were initially dispensed on metformin



Implications - International comparison with guidelines adherence

The results indicate:

1. Metformin monotherapy majority of all first dispensed T2DM therapies over the nine years studied
2. Currently accounts for 85% of all dispensing.
3. First-line sulfonylurea monotherapy has decreased over time.
4. Growth in in co-prescribing of metformin with insulin.

Indicate high levels of adherence with the national treatment guidelines for T2DM.

International Experience

- International studies considering T2DM prescribing patterns have not demonstrated such a high degree of adherence, (though guidelines and available treatments can differ across countries).
- Use of metformin as a first-line agent ranges from as low as 17% to (a relatively modest) 51%.
- Sulfonylurea use as first-line therapy has ranged from (a still relatively high) 18% to as high as 85%

Second Line Dispensing

- Sulfonylurea monotherapy accounted for 70% of all second-line dispensing
- 86% in those who initially started metformin for those in the 2007/8 cohort.
- Demonstrates good adherence with national T2DM treatment guidelines.
- They remain useful and effective treatments.

Second Line International Experience

- Internationally, for patients initially prescribed metformin, sulfonylureas have been used in 56% or 80% as second-line.
- Choice of second-line agent can differ across different countries
 - Treatment guidelines are different
 - In Japan recent study showed DPP-4 were the most common second line agent.

Equity

- Forthcoming analysis has looked changes in age of anti-diabetic agent dispensing by ethnicity
- Demonstrated trend to earlier prescribing of metformin particularly.
- Large differences between age of first prescribing of metformin between NZ Europeans and:
 - Māori
 - Pacific
 - Indian ethnic groups

Future:

- This analysis has identified several future research opportunities.
- The time taken to escalate/add treatments for managing T2DM
- Clinical Inertia attracting increasing attention within the literature, with concerns treatment is not being optimised in patients
- Further research is warranted into this area in the NZ context, especially among differing ethnic groups

Conclusions

- High degree of adherence to the T2DM prescribing guidelines.
- Metformin and sulfonylureas are the most commonly dispensed first and second-line agents for T2DM
- Further research is warranted into:
 - The demographic patterns of anti-diabetic prescribing
 - Treatment transition timeframes and the issue of **clinical inertia** (particularly if it is differential across ethnic groups) in managing patients with T2DM in NZ.

Questions