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Key Partners

Bumblebee
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2023 at a glance

125 validated transects

92 transects walked at least
6 times

86 recorders

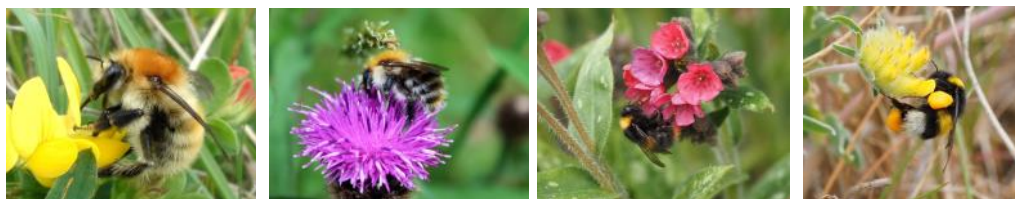
1,000+ km walked

850 hrs of effort

20,379 bumblebees

14 species recorded

2023: Half of our most common bumblebees are in decline



Four species in decline: Large Carder Bee, Common Carder Bee, Early Bumblebee, White-tailed Bumblebee

2023 was the 12th year of the All-Ireland Bumblebee Monitoring Scheme. Thanks to the combined effort of the schemes expert volunteers, we know that bumblebees remain in a precarious position generally, with four of our common species now showing worrying negative trends

What is it? The All-Ireland Bumblebee Monitoring Scheme is a citizen science scheme that tracks population trends in Irish bumblebees, detecting the impacts of factors such as land use and climate change on the Irish bumblebee population. It involves walking a fixed route (transect) on a monthly basis from March to October each year, when weather conditions are favorable. The number of the different bumblebee species seen along different sections of each transect are recorded. These recordings are the basic data upon which the analysis is based.

What type of analysis is completed within the scheme? Two separate analyses are undertaken to determine the change (if any) in bumblebee populations. The first is a multi-species index which estimates the overall direction of change in the bumblebee population, as a whole, using Ireland's most common bumblebees (8 species). A trend line is estimated from the multi-species index which summarises the overall direction of the population change since the commencement of the recording scheme (i.e., 2012). The second type of analysis is the estimation of a trend that tracks the status of the individual species of bumblebees. The multispecies index and the individual species trends are estimated using international best practice methods developed by Statistics Netherlands (TRENDS and INDICES for Monitoring data, TRIM, Pannoeck & van Strein, 2005; Multi-Species Indicators, MSI, Soldaat et al., 2017).

What does the addition of the 2023 data tell us?

- The most important thing it highlights is the phenomenal effort our citizen science volunteers have put in over the years. In 2023, they collectively spent 850 hours walking over 1,000 km, counting 20,379 bumblebees across 14 species! Without their generous efforts, we simply would not know how the populations of this vitally important group of insects are changing.
- 2023 saw a record ninety-two transects walked at least 6 times from March-October. This is an incredible achievement and we thank all our volunteers. We are getting closer and closer to our target of 100!
- The weather was poor in 2023, and this is reflected in the data. Bumblebee numbers were below average for most of the year, other than a peak in July.
- While we do now have twelve years of data, we still have to err on the side of caution in reading too much into the trends until a longer term dataset is available. The current overall trend from 2012-2023 is a year-on-year decline of 3.3% (unchanged from last year). As expected, with the addition of more data each year, the estimates are improving. The trends do still indicate that bumblebees generally remain in a precarious position, but there is some evidence that the overall trend may be starting to stabilise.
- Without doubt, the most worrying findings come from the individual species trends. The current analyses flags four of our common species as being in decline. The addition of the 2023 data reveals that the Large Carder Bee (*Bombus muscorum*) is still in serious decline nationally. The Common Carder Bee (*Bombus pascuorum*) remains in moderate decline. Unfortunately, the data suggests that the White-tailed Bumblebee (*Bombus lucorum* agg.) and the Early Bumblebee (*Bombus pratorum*) are also now in moderate decline.
- In 2021, in response to findings from the All-Ireland Bumblebee Monitoring Scheme, the All-Ireland Pollinator Plan published an evidence-based guideline on how local communities can help protect the Large Carder Bee: <https://pollinators.ie/helping-endangered-pollinators/large-carder-bee/> While it remains in difficulties nationally, we know that where actions are being taken by local communities, the bee is responding and it's local status can improve relatively quickly. While it is clear that we need to greatly step up our efforts, this does bring hope for the future of those species currently struggling.
- The Tree Bumblebee (*Bombus hypnorum*) is our most recent bumblebee arrival, being first recorded from the island of Ireland in Autumn 2017. It was recorded on one transect in Northern Ireland in 2021, and on three in 2022. In 2023, it occurred on nine transects, including three in the Republic of Ireland.



Bombus hypnorum



Bombus lapidarius



Bombus pascuorum

Figure 1: Total number of each bumblebee species recorded in 2023

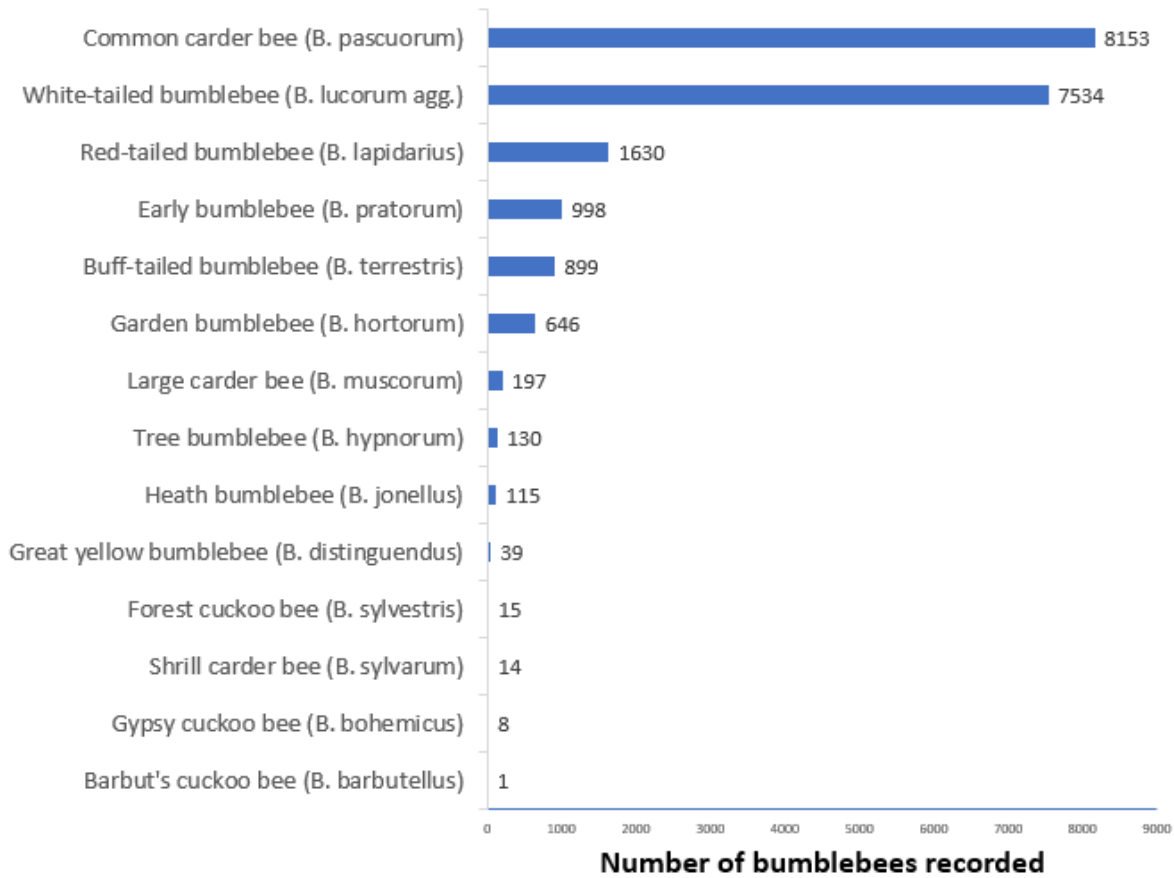
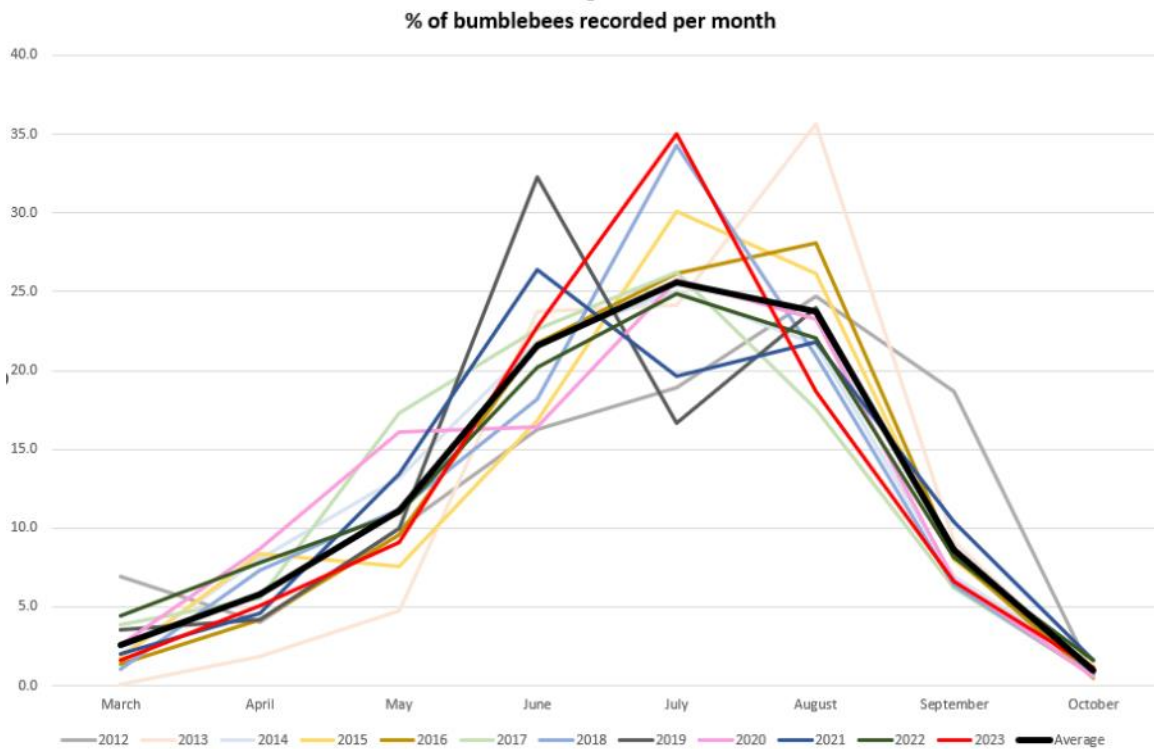


Figure 2: Percentage of bumblebees recorded per month since 2012



Bumblebee population trends 2012-2023

Multispecies Index of bumblebee population change 2012-2023

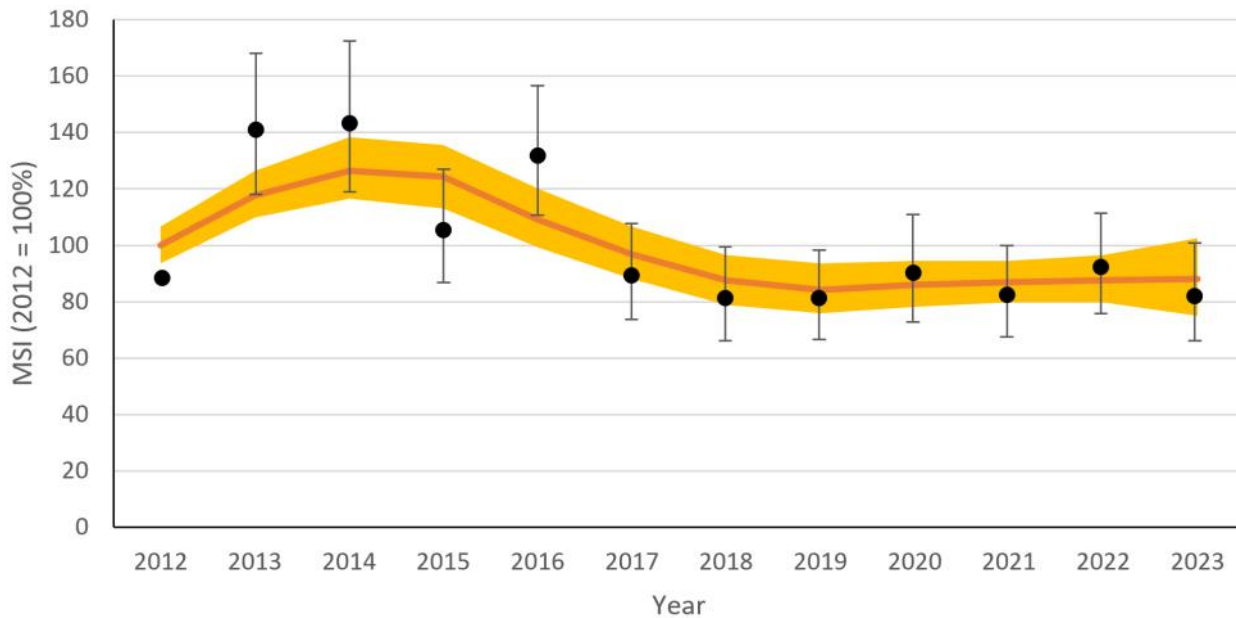


Figure 3: The multi-species index derived from the amalgamation of the population trends of 8 common species of bumblebees from 2012 to 2023. The dark orange line is the smoothed trend line, and the circle markers represent the multispecies index per year. Error bars (on markers) and the shaded area surrounding the trend line are the 95% confidence intervals.

Trends in the bumblebee population, as a whole

The “multispecies index” of bumblebee population change (above) illustrates our estimates and the level of statistical confidence around those estimates. It is based on the eight species where we have sufficient information to accurately assess changes. This year, things have continued to stabilise, but it is still showing an overall loss across populations since 2012. The current overall trend from 2012-2023 is a year-on-year decline of 3.3% (with a 95% confidence interval). While we now have twelve years of data, we have to err on the side of caution in reading too much into these trends. A longer term dataset is still necessary to smooth out the fluctuating impacts of Irish weather.

Individual species trends

As the dataset builds, it also becomes possible to better assess the status of individual species. Unfortunately, the addition of the 2023 data, indicates that four of our most common species are now in decline. The simple message is that we need to do more to make the entire landscape across the island more pollinator-friendly. The framework is there, but we need to continue ramping up action through the All-Ireland Pollinator Plan.

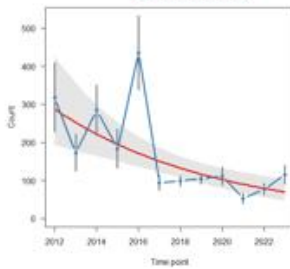
Unfortunately, the Large Carder Bee (*Bombus muscorum*) remains in strong decline. This species is listed as Vulnerable in the 2014 European Bee Red List. Ireland is one of its strongholds within Europe, making our trends all the more concerning. In a positive, increasing numbers of local communities have been coming together through the Pollinator Plan to create joined up habitat corridors for the bee, and are already seeing a positive response in their local areas. It shows that things can be turned around, but urgent action is needed.

Bumblebee species trends 2012-2023

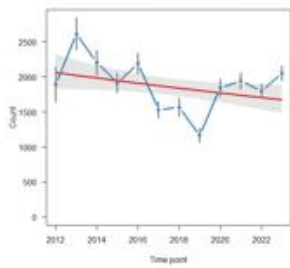
Species	Change 2012-2023	Statistical Confidence
<i>Bombus muscorum</i> (Large carder bee)	Strong Decline (> 5% p.a.)	95%
<i>Bombus pascuorum</i> (Common carder bee)	Moderate Decline (< 5% p.a.)	95%
<i>Bombus pratorum</i> (Early bumblebee)		
<i>Bombus lucorum</i> agg. (White-tailed bumblebee)		
<i>Bombus jonellus</i> (Heath bumblebee)	Uncertain	
<i>Bombus lapidarius</i> (Red-tailed bumblebee)		
<i>Bombus hortorum</i> (Garden bumblebee)	Stable	
<i>Bombus terrestris</i> * (Buff-tailed bumblebee)		

* Based on queens

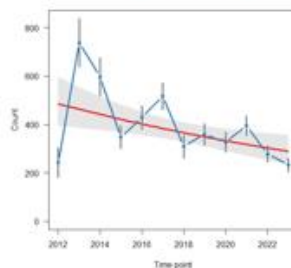
Bombus muscorum



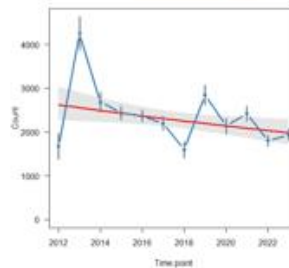
Bombus pascuorum



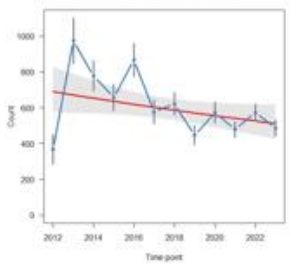
Bombus pratorum



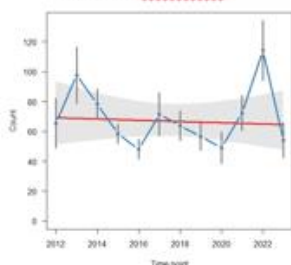
Bombus lucorum agg.



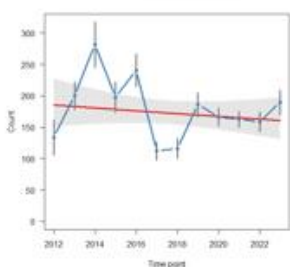
Bombus lapidarius



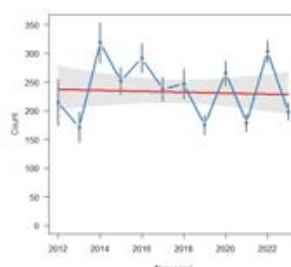
Bombus jonellus



Bombus hortorum



Bombus terrestris



How do we want to improve the All-Ireland Bumblebee Monitoring Scheme?

1. While the scheme continued to grow in 2023, the most critical thing is that we still need more walks. It is reliant on long term walks that are visited at least 6 times a year. Where some months are missed, it is possible to calculate estimated counts using the previous and subsequent counts, but the fewer missed counts the greater the accuracy of the data. Ensuring transects are walked as much as possible, for as many years as possible, will allow us to reap the biggest benefits from the data. There is an understandable flux of volunteers within citizen science schemes like this, so the more walks we have the better!
2. Currently, we are only gathering sufficient data to analyse trends in eight of our most common bumblebee species. Some species are exceptionally rare and will always be outside the scheme, but there are others where a dedicated campaign to encourage volunteers to establish transects in areas where these less common species occur would be useful. This will require workshops and we hope to continue progressing this in the coming years.
3. We need to continue ensuring that the findings of this scheme are translated into action. Within the All-Ireland Pollinator Plan, we have taken on board what it is telling us, and have been encouraging proactive measures to better protect the Large Carder Bee at local levels. This will continue, as where communities are taking evidence-based actions, the bee is positively responding. A recent UK study (2024) has highlighted that the lack of forage sources early in spring is a key factor in the decline of bumblebees. This is in the period when queens are establishing their nests and brooding the first batch of larvae, before bumblebees are commonly observed. In future years, we will ramp up efforts to encourage the return of more early forage sources to our landscape.
4. We now have very large quantities of data since 2012. In coming years, we hope to carry out more analyses, beyond the core multi-species index and individual species trends. For example, how concerned should we be that just two species now seem to be predominating in terms of numbers of individuals counted? We hope this will help us better understand how to improve the scheme and how to better support our volunteers. It remains our future aim to be in a position to provide feedback on individual trends to those volunteers who have long term walks in the scheme.

THANK YOU!

Most importantly, a sincere thank you to every single one of the volunteers who make this scheme possible. Without their efforts in walking their transects once per month, double-checking IDs, sending in photos and ultimately submitting their records to the Data Centre, we simply would not understand what is happening with bumblebees, and would lack the evidence-base to help us protect them into the future.

Thanks to the following for photographs used in this report: Colin Stanley, Fearghal Duffy, Janet Whelehan, Ruth Wilson, Martin Fitzpatrick, Marina Brennan, Carol Gilroy, Micheal O'Briain.



Bombus distinguendus

If you would like to reference this document: FitzPatrick, Ú & Judge, M (2024) 'Half of our most common bumblebees are in decline', *All-Ireland Bumblebee Monitoring Scheme, Annual Report 2012-2023*. National Biodiversity Data Centre.

All-Ireland Bumblebee Monitoring Scheme recorders in 2023

Recorder	County	Recorder	County
Áine Fenner (4 walks)	Longford & Westmeath	Darren Reidy	Dublin
Alan Balfe	Kerry	Dave Suddaby (2 walks)	Mayo
Anthea Southey (2 walks)	Kilkenny	Dean MacCuladh	Armagh
Andrew Halliday	Louth	Deirdre Murray (4 walks)	Tipperary
Andrew Mooney (3 walks)	Dublin	Donal Toolan	Waterford
Barry Walsh (2 walks)	Wicklow	Edward Hill	Dublin
Bernadette Connolly	Cork	Eileen Moylan	Meath
Bernadette Fennell (2 walks)	Dublin	Emma Stewart-Liberty (2 walks)	Clare
Breda Curran	Kilkenny	Fiona Mohr	Galway
Brid Colhoun/Horacio Prie-	Killarney	Fiona Treacy	Dublin
Carol Killarney (2 walks)	Galway	Genevieve O'Reilly, Derek Wilson, Mags McGarvey (2 walks)	Down & Antrim
Cassandra Collins	Kildare	Geoff Newell (2 walks)	Antrim
Catherine Penny	Limerick	Gerry Lane	Clare
Celia Graebner	Mayo	Isobel Kurz	Wicklow
Charles Heasman	Dublin	Jane O'Sullivan	Kerry
Ciara Reddie	Meath	Janet Whelehan	Wexford
Ciaran Taylor	Wicklow	Jerome Walsh	Laois
Clare Hamilton	Dublin	Jill Macklin	Dublin
Colette Blaney	Limerick	Jim Carolan	Kildare
Colm Damery (3 walks)	Cork	Joanna Hodgton	Wexford
Conall McCaughey	Down	John Belshaw	Antrim
Damien Clarke	Antrim	Justin Ivory (5 walks)	Wicklow
Dara Mac Domhnaill	Dublin	Karina Dingerkus	Mayo
Dara Stanley	Dublin	Katy Bell	Down

All-Ireland Bumblebee Monitoring Scheme recorders in 2023

Recorder	County	Recorder	County
Kirsty Hilliard	Dublin	Paula Farrell	Kildare
Kirsty Orr (2 walks)	Down	Ralph Sheppard	Donegal
Lee Donohue	Meath	Raymond Kazmierczak	Clare
Lorcain Cameron	Dublin	Richard Walsh	Kilkenny
Louise Garcia (3 walks)	Tipperary	Rob Wheeldon	Leitrim
Lydia Thompson	Dublin	Rory Finnegan	Kildare
Lyn Nolan	Limerick	Rose Cremin	Fermanagh
Malachy Martin	Fermanagh	Rosemary Rooney	Carlow
Margaret Brennan (2 walks)	Carlow	Ruairí Mac an Tuile	Carlow
Mary Brennan	Kilkenny	Ruth Wilson	Down
Mary Foley	Wexford	Sallyann Marron	Clare
Mary Gethings	Wexford	Sarah Kelly	Antrim
Mary McSweeney	Dublin	Saorla Kavanagh	Waterford
Mary Montaut	Dublin	Sean Forde	Kerry
Mary O'Connor	Kilkenny	Sharon Parr	Clare
Michael McAllister	Antrim	Simeon Cathcart	Antrim
Michelle Judge	Waterford	Sophia Couchman (2 walks)	Kildare & Carlow
Mireille McCall (2 walks)	Kildare	Sr Fionnuala O'Connor	Dublin
Muriel Moore, Patrick Arthur (3 walks)	Down & Antrim	Stefania Oggioni	Westmeath
Nabla Rea	Kilkenny	Tom Gittings (2 walks)	Cork
Nichola Ejaz	Derry	Tony Miller	Cork
Oisín & Mairead Duffy (2 walks)	Waterford	Úna Fitzpatrick (4 walks)	Waterford
Pat Walsh	Kildare	William Bryan	Waterford
Patrick Fahy (2 walks)	Mayo		

These were all registered on the online system and at least one month of data added for 2023. Not all were included in analyses.