Infant Feeding Surveillance Knowledge Exchange Continuation Project

**User Guide and Report on the Analytic Guidance for
the Prospective Multiple Time Point Questionnaires**

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Acknowledgements

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Contents

Executive Summary

From 2016-2017, a Knowledge Translation team from seven Public Health Units (PHUs) developed comprehensive analytic guidance for using the 6-Month Retrospective Single Time Point Questionnaire (6MRQ) from the original Infant Feeding Surveillance Pilot Study Locally Driven Collaborative Project (LDCP). However, similar tools did not exist for PHUs using the Prospective Multiple Time Point Questionnaires that were also developed as a part of this original study. Building on the work of the 6MRQ Knowledge Translation team, the Infant Feeding Surveillance Prospective Questionnaires Knowledge Exchange (IFS PQ KE) Project team was formed from individuals at five PHUs. Funding was provided by the Knowledge Exchange Continuation Fund from Public Health Ontario's (PHO) LDCP program. This IFS PQ KE project aimed to promote the use and engage users of the prospective questionnaires to address the outstanding obstacles, such as a lack of common indicator definitions, encountered by PHUs by developing standard analytic guidance resources for analysis of prospective questionnaire data.

This report briefly describes the methods and results of user engagement activities, such as a PHU survey and conference sessions, and presents the standard analytic guidance resources developed over the course of this 14-month project. These resources include: any and exclusive breastfeeding core indicator documents, a comprehensive standard data dictionary for all prospective questionnaires and standard statistical syntax to calculate the indicators in four commonly used software programs.

Limitations of the resources and project are also discussed, such as the pros and cons of using the tools for cross-sectional versus longitudinal analysis, the challenge of developing resources for tools that may have already been customized and the evolving infant feeding surveillance landscape. Ultimately, it is up to the users of the analytic guidance to decide what will work best for their own PHU's population and design their analytical approach accordingly. It is hoped that this project will fill the unmet need for analytic guidance for users of the prospective questionnaires, and while there are still caveats, that it will contribute towards the consistent analysis and reporting of externally comparable infant feeding surveillance information across PHUs.

1. Background

From 2013 to 2015, the Infant Feeding Surveillance Pilot Study Locally Driven Collaborative Project (LDCP) was conducted to develop a standardized tool and method for collecting infant feeding surveillance data, enabling Public Health Units (PHUs) to have locally useful and externally comparable data.[1] The LDCP identified two methods for collecting this data:

1. Retrospective 6-month single time point questionnaire (6MRQ). Retrospective approaches involve asking people about events that have already taken place.
2. Prospective Multiple Time Point Questionnaires (prospective questionnaires), to be administered at approximately two months (2MPQ), six months (6MPQ), 12 months or more (12+MPQ) post-partum. Prospective approaches involve following people forward in time and asking them about events that are currently taking place as they happen.

From 2016-2017, an LDCP team from seven PHUs developed comprehensive analytic guidance for the first option using the 6-Month Retrospective Single Time Point Questionnaire (6MRQ).[2] However, similar tools did not exist for PHUs using the prospective questionnaires. Building on the work of the 6MRQ Knowledge Translation team, the Infant Feeding Surveillance Prospective Questionnaires Knowledge Exchange (IFS PQ KE) Project team was formed. This team consisted of public health professionals from five PHUs from the original LDCP Infant Feeding Surveillance Pilot Study, including one member also from the 6MRQ Knowledge Translation project team. This IFS PQ KE project aimed to promote use and engage users of the prospective questionnaires to address the outstanding obstacles, such as a lack of common indicator definitions encountered by PHUs using prospective questionnaires by developing standard analytic guidance resources (such as statistical software syntax) for analysis of prospective questionnaire data. A biostatistical consultant was also hired to assist with the complex task of building statistical software syntax in the four most commonly used statistical software packages.

This report describes the results of the project and the resources developed over the course of this 14-month project (February 2017 to March 2018) that was funded by the Knowledge Exchange Continuation Fund from Public Health Ontario's (PHO) LDCP program.

The landscape for infant feeding surveillance in Ontario continues to evolve. Collecting infant feeding surveillance data is a requirement of Baby-Friendly Initiative (BFI) designation, administered by the Breastfeeding Committee for Canada (BCC). All PHUs were required to work toward BFI designation according to the 2011 Ministry of Health and Long-Term Care's Accountability Agreement. During the course of the IFS PQ KE

project, the new 2018 Ontario Public Health Standards came into effect, which do not explicitly require PHUs to work towards BFI designation. The BCC also published revised guidance documentation on calculating breastfeeding rates for community health providers.[4] Even without the requirement for BFI designation, collecting and reporting on infant feeding practices is still listed in the *Population Health Assessment and Surveillance Protocol, 2018.*[3] Breastfeeding remains a key public health indicator to inform program planning due to the importance of breastfeeding to child health and development. It is hoped that the work of the IFS PQ KE team will help facilitate the often time-consuming and complicated task of analyzing this data and providing the results in a standardized way across Ontario PHUs using the LDCP prospective questionnaires.

2. Methods

Similar to the 6MRQ Knowledge Translation project, the IFS PQ KE project included two main types of work; tasks related to engaging users of the prospective questionnaires and the associated information, and those related to developing the analytic guidance resources.

2.1 User engagement

There were three key groups for engagement. Table 2.1 summarizes the groups and the activities through which each were engaged.

Table 2.1 User groups and activities for engagement

User group name	Group description	Project activities where engaged
Provincial Infant Feeding Surveillance Group (PIFSG)	A working group comprised of public health professionals in local PHUs, primarily members of the original Infant Feeding Surveillance Pilot Study project, with representation from over 30 Ontario PHUs. Members of this group meet regularly to exchange knowledge and discuss the challenges of implementing local infant feeding surveillance systems.	PHU survey, resource peer review, regular updates at PIFSG
Local PHU infant feeding surveillance teams	This group consists of epidemiologists, analysts, evaluators, health promotion specialists, and any other staff members responsible for analyzing the collected infant feeding data. These individuals generally appreciate clarity, technical details and practical applications to guide their analytic work.	PHU survey, resource peer review
The Association of Public Health Epidemiologists in Ontario (APHEO) members	Full and affiliate members of APHEO, primarily consisting of PHU epidemiologists and analysts, but also includes individuals from a broader public health epidemiology community, e.g., from provincial or federal government agencies	PHU survey, APHEO conference session, resource peer review

The project team used the following approaches to engage these groups throughout the project:

1. **PHU survey:** We conducted a survey in June 2017 to identify which PHUs were using the prospective questionnaires and their perceived strengths and challenges of prospective IFS data collection, to ensure that any analytic guidance tools developed for the prospective questionnaires will meet users' needs, and to determine if any change in IFS practices across the province occurred since the survey of PHUs by the 6MRQ team in 2016.[5]

2. **APHEO conference session:** We conducted a session at the APHEO conference in November 2017 that provided attendees with information about the project and our objectives and deliverables. In the session we:

   a. Presented findings from our PHU survey and provided to participants a hard-copy draft of the data dictionary and flowcharts developed to date, and demonstrated running the draft statistical syntax and results;

b. Facilitated a brief discussion about experiences, challenges, needs and successes with the prospective questionnaires and with infant feeding surveillance in general;

c. Invited attendees to participate in the detailed resource peer review process.

3. **Resource peer review:** We invited users via email and verbally at the APHEO session to participate in a detailed peer review of the draft analytic guidance resources developed in this project. All individuals who accepted the invitation to be peer reviewers were sent the draft resources (indicator/flowchart documents, data dictionary and statistical syntax in four commonly used programming languages). They were given three weeks to complete their review. The peer review was completed in February-March 2018.

4. **PIFSG regular updates:** We provided regular updates, invited questions and sought input on specific issues, including the BCC's new guidance on breastfeeding indicator calculation. We also participated in brief consultations and discussions of methodological and analytic issues with PIFSG members from PHUs using the prospective questionnaires.

5. **Webinar/Conference presentations:** To disseminate final project results, we will present at part of the PHO Epidemiology Rounds webinar series in April 2018. We may also submit abstracts to conferences that attract stakeholders involved in infant feeding surveillance activities and data use.

2.2 Resource development

The project team met at a face-to-face meeting on April 7, 2017, establishing the project plan and timelines, and major deliverables, including the need for another PHU survey, and the concepts for and analytical methods of the resources. We completed the majority of the resource development work remotely from July 2017 to March 2018, meeting at least monthly via teleconference to keep the project on track.

The PHU survey results, summarized in Section 3.1.1, were used to guide the development of the resources in Table 2.2. These resources were ultimately developed and released by the project team and are included as a part of this user guide.

Table 2.2 Overview of analytic guidance resources for use with the prospective questionnaires

Appendix	Name	Purpose
Found in separate report[5]	Public Health Unit survey results	Provides updated context on the landscape of infant feeding surveillance methods and activities in Ontario's PHUs as of June 2017. Also includes a description of challenges and successes users have had with prospective questionnaires and users' needs for analytical resources.
A	Core indicators documents - Any breastfeeding - Exclusive breastfeeding	Provides detailed description of how to calculate each indicator including calculation formula, analysis notes, and a flowchart for visual illustration of how relevant survey questions are used in the calculation.
B	(Detailed) Standard Data Dictionary	Provides users with standard labels and formats and other information for the 2 month, 6 month and 12+ month questionnaires and their questions/responses, with questionnaire skip patterns included.
C	"Cheat Sheet" for statistical syntax	Supplementary documentation applicable to all statistical syntax files that includes a summary of key questions used to calculate indicators, a brief explanation of macros used across programs and instructions on how to use syntax files.
D	Stata syntax	Can be used in Stata software to calculate the core indicators for a dataset formatted as per the data dictionary.
E	SPSS syntax	Can be used in SPSS software to calculate the core indicators for a dataset formatted as per the data dictionary.
F	SAS syntax	Can be used in SAS software to calculate the core indicators for a dataset formatted as per the data dictionary.
G	R syntax	Can be used in R software to calculate the core indicators for a dataset formatted as per the data dictionary.

As with the 6MRQ project, there were some issues identified by project team members and reviewers with the original LDCP prospective questionnaires and recommended skip patterns, which have been documented below. Where possible, the resources were adapted to address these, but recognizing the complexity of developing analytical methods for multiple surveys, the fact that many PHUs have already made revisions to their versions of the prospective questionnaires and survey methods based on local

needs, and the changes to the Ontario Public Health Standards, fully revised versions of the prospective questionnaires were not developed.

3. Results

3.1 User engagement

3.1.1 Public health unit survey

Responses were received from 29 of the 36 PHUs in Ontario (an 80.5% response rate). The survey results confirmed that IFS practices still vary across Ontario, as over half of responding health units (58.6%; 17/29) use some form of a prospective questionnaire. In particular, 41.4% (12/29) use at least one of the specific prospective questionnaires recommended by the LDCP team. Some common reasons PHUs chose to use the prospective approach included: to reduce recall bias, to support and maintain contact with new parents and to increase the response rate. However, many challenges to implementing prospective data collection were also identified, including staff capacity and time involved in calling respondents/collecting data, high attrition between survey time points, and difficulty recruiting and obtaining consent. Those using prospective questionnaires identified a strong interest (66.7% of PHUs) in having standardized statistical syntax in multiple software programs (with STATA being the most commonly identified software package), as well as core indicator documents (53.3%), and data dictionaries and survey flow chart diagrams (20.0% for both). These results confirmed the importance of and guided the development of the resources. More detailed results from our PHU survey are available in a separate report.[5]

3.1.2 APHEO conference session

After presenting the results of the PHU survey and showcasing the draft analytic resources, several questions were posed to the attendees for discussion and recorded on flip-chart paper. There were approximately 20 attendees, most of whom were from Ontario PHUs, but there were also attendees from Statistics Canada, University of Toronto, and a northern Ontario First Nations Health Authority.

About one-third of the PHU attendees were using the prospective questionnaires. Session participants noted some of the same challenges with the prospective questionnaires and data collection that were identified in the survey. There were also some new ideas brought forth, including a concern about not asking about liquids other than breastmilk and formula on the 2MPQ and its effect on overestimating exclusive breastfeeding and dealing with contradictory responses on the respondents' questionnaires over time. There was also some discussion of including signs of behavioural readiness for solids, and the need to calculate exclusive breastfeeding at

both 5.5 and 6 months. They also raised a number of concerns related to infant feeding surveillance more broadly that were outside the scope of this project. These broader concerns echoed what was found in the PHU survey, and included challenges with obtaining consent, dropping sample sizes, and asking questions in a culturally sensitive manner both on the phone and online, so as to elicit truthful responses.

A success that was mentioned was the benefit of using a hybrid model of both online and telephone questionnaire completion on increasing sample size, where PHUs had the resources to do so. Finally, attendees were asked what effects the new OPHS might have on infant feeding surveillance, and while there was not much time for discussion, many attendees agreed that breastfeeding is an area in which we need to keep improving.

3.1.3 Peer review of resources

A statistical consultant was hired to work with the team to develop an analytical approach and validated statistical syntax in four software packages. As such the resource review process was quicker and less involved for PHU project team members. Early in the project, the group decided the best approach to take was the most parsimonious; to calculate basic rates for any and exclusive breastfeeding, similar to the 6MRQ project. Given the differences in sampling, data collection, and the mixture of prospective and retrospective questionnaire use across PHUs, two methodological options are incorporated into the syntax: treating the data as cross-sectional and using all possible respondent data, or treating the data as longitudinal and using only the data of the respondents that completed all three prospective questionnaire time points (2MPQ, 6MPQ and 12+MPQ).

In addition to the IFS PQ KE project team members, several additional users of the prospective questionnaires were recruited for participation in a peer review of the analytic guidance documents. We requested that the review of each item focus on clarity, comprehensiveness, accuracy, and omissions, though all comments were appreciated. We collated the feedback we received from the peer reviewers in an issues list, discussed it via email and teleconference, and revised the analytic resources as needed.

3.1.4 Future presentations

Project team members will present at the Public Health Ontario Epidemiology Rounds (April 19, 2018); future opportunities may be identified in the future.

3.2 Resources

The following sections describe the resources that were developed. For an overview of the resources and where to find them in this report, see

Table 2.2 in Section 2.2.

3.2.1 Core indicators with flowcharts

Core indicator documents[6] were developed for two surveillance indicators: any breastfeeding and exclusive breastfeeding, as required for BFI designation. Each core indicator document includes a description of the indicator, method of calculation based on questions in the corresponding prospective questionnaire, complementary flowcharts to illustrate the analysis logic, and relevant notes for analysis, reporting and interpretation of the indicator.[2] It should be noted that any breastfeeding is calculated for all three prospective questionnaire time points, while exclusive breastfeeding is calculated only for the 2MPQ and 6MPQ time points, based on the World Health Organization (WHO) recommendation to introduce complementary foods to infants at about six months of age.[7]

3.2.2 List of issues and revisions to the prospective questionnaires

Those currently using the prospective questionnaires identified several issues and limitations with the questionnaire. Table 3.1 summarizes these issues, along with the potential revisions by the project team. It is up to each individual PHU to determine whether to implement the changes.

Table 3.1 Summary of issues with the prospective questionnaires and suggested revisions

#	Issue	Recommendation
Questionnaire wording/option and data dictionary changes		
1.	On both 2MPQ and 6MPQ, consider revision of Q7/Q5 (What fed baby in past week) response options, to include a fourth option: "Other-no breastmilk nor formula."	This fourth option would be a red flag, but assumes these responses are being monitored and flagged for support accordingly, which is not always the case. It is up to the individual PHUs whether this option is added. However, it would cause major implications to the skip patterns if using the standard prospective questionnaire tools provided.
2.	On 2MPQ, Q11 (Reasons stopped breastfeeding)/ Q21 (Difficulties/concerns BF): Problems expressing/delivering breastmilk is listed under baby reasons.(On 6MPQ, these are Q9/Q17, and is Q7 on 12+MPQ.)	Revise to maternal reasons, rather than baby reasons, and re-number maternal reasons.

#	Issue	Recommendation
3.	On 2MPQ Q26 (Breastfed or tried to BF before), wording is unclear.	Revise to "Prior to this baby (or these babies in the event of multiples), have you breastfed or tried to breastfeed before?"
4.	On 2MPQ Q30 (Highest level of education), "some high school" is the lowest option, but in certain religious or ethnic populations, people may not have any high school.	Add in additional category to response options to have an option of "less than high school."
5.	On 2MPQ, not asked about other liquids, so could be overestimating exclusive breastfeeding.	No revision required; if parent answered 6MPQ, will know age at which liquids introduced, as time range from <0.5 months onward, if using longitudinal approach. If using cross-sectional approach, could use 6MRQ.
6.	On 6MPQ Q25, (Health care provider recommend giving solids then), clarify wording.	Recommend re-wording to, "When you introduced solid foods at that time, was it because a health care provider recommended it?"
7.	On 6MPQ Q26 (Reasons baby given solids), LDCP survey does not have it formatted for multiple responses.	Revised to be formatted for multiple responses (this is how some PHUs have done it).
Skip pattern issues		
8.	On 2MPQ, Q12 (Reasons you never breastfed), which is only asked of those currently formula feeding (Q7=2), who have never breastfed (Q9=0), in the "Go to" column, there is a statement "If Q9=1 (Yes, ever breastfed), go to Q13. If Q9=0/88/99 (No/Don't know/Refused), go to Q15 (Did a HCP recommend formula)." However, if Q9=1, they never would have been asked Q12 in the first place, because they are currently formula feeding and *have ever* breastfed.	Recommend that all respondents in this situation, regardless of answer to Q9, should be routed to Q15. Remove statement "If Q9=1 (Yes, ever breastfed), go to Q13." Revise Q12 Go To column to Q15 for all responses.
9.	On 2MPQ, skip pattern assumes that when Q13 (Baby given formula in hospital)=1(Yes), the hospitalization was at time of birth, so Q14 (Age baby had formula) is skipped.	Recommend that all respondents should be asked Q14 after Q13, not skipped to Q15 (Did a HCP recommend formula), just in case the answer to Q14 when formula first

#	Issue	Recommendation
		given is different (i.e., may have been given in hospital, but not at birth).
10.	On 6MPQ, if parent answers the following: Q5=Formula, Q7=Yes attempted to breastfeed, Q8 (Age stopped breastfeeding, Q9 (Reasons stopped breastfeeding), parent is skipped to Q11 (Did a HCP recommend).	Recommend current formula feeders still be asked Q10 when started formula, as it likely occurred before stopping breastfeeding, and whichever occurs first ends exclusivity.
11.	On 6MPQ, if parent answers Q10 (Age first given formula)<2months, they are skipped to Q14, while rest of respondents skip to Q11.	No revision required because it's assumed they've completed the 2MPQ and have already answered this there.
12.	On the 6MPQ, if parent answers Q11 (Did a HCP recommend baby formula)=1 (Yes), they will not be asked Q13 (Reasons for formula), or Q14 (Is work a factor in how long they plan to breastfeed). On 6MRQ, they do get Q13 and Q14.	This relates back to issue 9. If corrected on 2MPQ, this issue will be addressed. Alternatively, the 6MRQ can be used if analyzing cross-sectionally.
13.	On the 6MPQ, if a mother answers Q16 (Any difficulties)=1 (Yes) they are not asked Q18 (Used any programs/services to help with feeding baby) or Q19 (Which programs/services). On 6MRQ, they do get Q18 and Q19.	These are asked on 2MPQ (Q20/21), so if parent has completed 2MPQ, it will be addressed there. Alternatively, the 6MRQ can be used if analyzing cross-sectionally.

3.2.3 Detailed standard data dictionary

The data dictionary includes a tab for each prospective questionnaire, lists all of the questions for each, includes a variable name and label for each question and their response options from the original survey and the universe (i.e., respondents to whom the question applies). Each of the possible responses has been given a numerical code, where possible, to aid in data processing and analysis. To better understand the skip patterns within each survey, a "Go-To" column for each possible response has been added.

Many PHUs have customized the prospective questionnaires to meet their local needs, or are using a combination of the prospective questionnaires and the 6MRQ. As such, this data dictionary may need to be adapted or used in combination with the 6MRQ data dictionary by these PHUs. We recommend that any PHU-specific modifications made to

these should use different variable names and labels, to be clearly distinguished from those in the standard data dictionaries.[2]

While standardized syntax in four different statistical software packages has been provided, because of the variety of sampling and data collection methods, and combination of questionnaires used, considerable data processing is likely required before any given dataset will be formatted to properly align with the standard data dictionary. It is the responsibility of each analyst to ensure their PHU dataset is cleaned accordingly, and to generate and recode variables where necessary.[2]

3.2.4 Cheat sheet and prospective questionnaire statistical syntax

As suggested by peer reviewers, for further clarity when working with the statistical syntax, a brief "Cheat Sheet" document has been included in Appendix C. This document outlines the key questions used to calculate indicators, information on data import steps and files (and how to modify these files as needed). It also includes an explanation of the macros used across programs.

We provided validated statistical syntax for Stata, SPSS, SAS and R with detailed commenting explaining the steps used to calculate the any and exclusive breastfeeding indicators. The STATA and SPSS syntax consist of more than one file; see Appendix C Cheat Sheet for instructions on how to use these. The SAS and R syntax are provided as single files with integrated instructions.

Wherever possible, the issues identified in Table 3.1 have been addressed in the syntax. Note that all syntax is based on variable names and response codes as per the standard data dictionary. Users who have adapted the prospective questionnaires should adapt these syntax programs accordingly. Also, it should be noted that additional analyses, such as crosstabs of breastfeeding indicators by age of parent and other socio-demographic variables, and/or determination of statistically significant differences between groups, are also up to the individual PHUs to design and were outside the scope of the project.

As the time points at which to calculate the breastfeeding indicators are up to the individual user, the comments in the syntax files, where applicable, note where these can be changed as desired depending on the software. If analyzing data from a cross-sectional perspective, it is recommended to use the 2MPQ to calculate any breastfeeding rates and exclusive breastfeeding rates up to but not including three months of age, as most PHUs have set up their surveys to enable users to complete them up to one month after the time point has past. While it is also possible to use the 6MPQ to calculate these indicators for this time frame, to ensure the answers used are closest to the event for accuracy, it is recommended to use the 6MPQ for time points greater than three months up to but not including seven months. Similarly, it is

recommended to use the 12+MPQ to calculate any breastfeeding for any time point at or beyond seven months. If analyzing data longitudinally, these recommendations are automatically accounted for in the syntax.

4. Limitations

4.1 Limitations of the prospective questionnaires and analytic guidance

There are some limitations of the prospective questionnaires and analysis even if the suggested revisions and analytic guidance is implemented.

4.1.1 Breastfeeding at entry to service

As the 6MRQ project team noted, the 6MRQ's use to determine breastfeeding initiation was an optional method, so it was decided not to include it here for those using the prospective questionnaires. As with the 6MRQ, for reporting breastfeeding initiation at entry to community health services, it is recommended that PHUs use the dimension "Feeding at hospital or Midwifery Practice Group (MPG)" with the measure "# of births – discharged home or home births" from the Better Outcomes Registry & Network (BORN) Information System.[2] Public health units can access the data collected in the BORN Information System either through the PHU data cubes or PHU standard reports.[2] Details on how to calculate breastfeeding rates at entry to service using BORN data can be found in the corresponding APHEO core indicator document.[8] Moreover, since BORN is Ontario's perinatal birth registry and as such, comprehensively captures data on all pregnancies and births in Ontario, and most Neonatal Intensive Care Unit admissions, it provides better coverage than is likely possible via local infant feeding surveillance methods.

4.1.2 Cross-sectional versus longitudinal analysis

Another issue that has arisen in the analysis of prospective questionnaire data is whether to analyze each time point cross-sectionally, or to take a longitudinal approach, as was intended by the original LDCP IFS project. Both options have been included in the syntax because there are benefits and challenges to both methods, and many PHUs have already chosen one method based on local needs.

For instance, analyzing the data from each time point cross-sectionally allows the user to keep as many responses as possible, increasing the potential sample size available for analysis. However, given that it is assumed the respondents have answered the 2MPQ, if a respondent skips the 2MPQ but is allowed to respond to the 6MPQ, there would be missing demographic data, and response options and skip patterns that may not make sense. For this reason, some PHUs have chosen to use the 6MRQ either alone or in combination with the 6MPQ, as was recommended by the original LDCP

project. However, given the complexity of setting up and analyzing more than one version of the 6M questionnaire, many PHUs have also chosen to allow respondents to complete the 6MPQ only if they have done the 2MPQ so that this is unnecessary, and therefore can analyze the data longitudinally.

If using a longitudinal approach, there may be attrition of respondents between time points, but keeping only those respondents that completed all three questionnaires will ultimately result in a smaller sample size for analysis. Breastfeeding rates may be artificially inflated, as people who continue to breastfeed may be more motivated to complete multiple questionnaires. Accordingly, it is important for analysts to report the prevalence of non-response at each time point when reporting breastfeeding rates, to be transparent about potential bias. Some PHUs have developed flowcharts showing where non-response occurs at each stage of data collection, e.g., clients that did not consent to being surveyed, clients that consented but never responded, etc.

4.2 Project limitations

There were some limitations to this Knowledge Exchange project. In our user engagement activities, we targeted users mainly via the APHEO listserv email list and through email communication and teleconferences with the PIFSG members. Given that not all PHU staff involved in local infant feeding surveillance activities participate in these two groups, some perspectives and information may have been missed.[2] Also, given the smaller number of users of the prospective questionnaires, there was a smaller pool of users to draw on, so there were only a few additional peer reviewers to provide feedback beyond those from the PHUs on the project.

Another challenge to the project was the changing infant feeding surveillance landscape. The effects of the revised Ontario Public Health Standards on whether PHUs will continue to work towards BFI designation, or seek re-designation, remains to be seen. The BFI guidelines for data collection have also been simplified with the explicit removal of the "total breastfeeding" indicator. Even so, with the overall importance of breastfeeding to healthy child growth and development, conducting infant feeding surveillance will continue to be relevant and necessary in public health in Ontario into the future.

Similar to the 6MRQ project, many PHUs have already implemented the prospective questionnaires and modified them to meet local needs. Some PHUs may have needed these analytic resources while they were still in development. It is our hope that these resources will be useful to all prospective questionnaire users, even with local customizations methods and tools.[2]

While it is difficult to develop standard analytic guidance that will work for all, to realize the goal of externally comparable infant feeding data, we hope that PHUs using

independent analytic methods will consider aligning their methods to the standard ones recommended here.[2] Users are strongly encouraged to be aware of the details of their PHUs' local customizations to the prospective questionnaires, and to adapt these standard analytic guidance resources to account for these customizations.[2] Ultimately, it is up to the user to decide what will work best for their own population and analyze the data accordingly.

5. Conclusions

This Knowledge Exchange project built on the work of the 6MRQ Knowledge Translation team from LDCP Infant Feeding Surveillance Pilot Study, providing detailed analytic guidance on the second of two recommended data collection tools from the original project, i.e., the prospective questionnaires. The analytic guidance resources include two core indicator documents, a data dictionary, and statistical syntax in four commonly used statistical software packages.

Without provincial leadership and support to standardize infant feeding surveillance practices across Ontario with a single universal infant feeding surveillance system, considerable variation still exists across PHUs in Ontario in how the prospective (and retrospective, where applicable) questionnaires have been implemented and adapted to meet local needs. These methodological variations likely limit the comparability of infant feeding data between PHUs. All users are encouraged to document their assumptions and methods, and how they may deviate from the standard analytic guidance now provided. These resources fulfill a previously unmet need of the PHUs who use the LDCP prospective questionnaires by providing guidance to analyze local infant feeding surveillance data for key public health core indicators on breastfeeding.[2]

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Appendix A – Core Indicators for the Prospective Questionnaires

Any Breastfeeding Core Indicators (Calculated using 2-month, 6-month and 12-month Locally-Driven Collaborative Project (LDCP) Prospective Multiple Time Point Questionnaires)

Description

- The proportion of babies who, as of <TIME>, were receiving human milk (including expressed milk, donor milk) with or without other liquids or solid foods.[1]
  - Any breastfeeding includes both exclusive and non-exclusive breastfeeding.
  - <TIME> may be equal to or less than the time point when the questionnaire was administered. If a Public Health Unit (PHU) has or is working towards Baby-Friendly Initiative (BFI) designation, a time point of 5.5 months may be used to evaluate breastfeeding rates 'at about' 6 months.[2,3] Common time points for reporting to the Breastfeeding Committee for Canada (BCC) include breastfeeding at 2 months, 4 months, 6 months and 12 months postpartum. Other time points may be chosen at the discretion of the PHU.

Indicator and method of calculation

Specific Indicator

- Any breastfeeding as of <TIME>.

Any breastfeeding

$$\frac{\text{Total number of babies who, as of <TIME>, were receiving human milk (including expressed milk, donor milk) with or without other liquids or solid foods}}{\text{Total number of babies for whom the survey was completed}} * 100$$

Data notes

1. To evaluate breastfeeding rates at about 6 months, a time point of 5.5 months may be used.[2,3]
2. The numerator includes both exclusive and non-exclusive breastfeeding.
3. Refer to the derived variable dExcluded in the Infant Feeding Surveillance Prospective Questionnaires (IFS PQ) Standard Data Dictionary (data dictionary) for exclusion criteria.[4] (Appendix B).

Reporting requirement

- If PHU has or is working towards BFI designation for community health services, surveillance requirements include recording data on entry to service and a minimum of two additional time points (e.g., 2 or 'at about' 6 months)[1-3] and 12 months and beyond. Additional time frames are required if breastfeeding rates are less than 75% at entry to service.
- Data on breastfeeding at entry to service may be extracted from the Better Outcomes Registry & Network (BORN) Information System. It is recommended that PHUs use the dimension **Feeding at hospital or Midwifery Practice Group (MPG)** with the measure **# of births–discharged home or home births**.[5] See APHEO Core Indicator on Infant Feeding for more information.[5]

Indicator objectives

- To demonstrate the any breastfeeding rate for babies at the PHU level.

Data sources

- **Numerator & denominator:** IFS 2-Month, 6-Month or 12-Month Multiple Time Point Questionnaires (prospective questionnaires).[6]
- **Suggested citation:** <Public Health Unit>, infant feeding surveillance data, collected using the IFS prospective questionnaires.
- **Core indicator documentation distributed by:** The IFS Prospective Questionnaires Knowledge Exchange (IFS PQ KE) LDCP team.

Analysis checklist

- The prospective questionnaires include at least three time points for which the any breastfeeding indicator may be calculated: 2 months, 6 months and 12 months. For time points after 12 months postpartum, (e.g. 18 and 24 months), the 12-month version of the questionnaire may be used.
- Questions used to calculate this indicator differ depending on which prospective questionnaire is used. Refer to Table 1 for 2MPQ, 6MPQ and 12MPQ questions.
- Refer to Figure 1 for 2MPQ illustration, Figure 2 for 6MPQ illustration, and Figure 3 for 12MPQ illustration.
- Refer to the IFS PQ data dictionary for coding variables.[4]
- Refer to the IFS PQ Cheat Sheet (Appendix C) and standard statistical syntax for calculating any breastfeeding indicator in the statistical package of choice (STATA, SPSS, SAS, and R) (Appendices D-G) to calculate these indicators. Additional information and instructions on how to use and modify the syntax are included in these files.[7]
- Two analytical methods are provided in the statistical syntax:
  - Cross-sectional, including any respondent that completed any one of the prospective questionnaires (2MPQ, 6MPQ or 12 MPQ), or,

- o Longitudinal, including only respondents who completed all three prospective questionnaires time points.[7]
- There are pros and cons to each analytical method in terms of number of observations and generalizability. It is up to each PHU to establish which method is optimal for their population.
- If using a combination of IFS PQs and 6MRQ, it will be necessary for the PHU to determine which elements from the two standard statistical syntax files (for STATA and SAS users) from each project to incorporate into final analysis.[7,8]

Notes

- There are no recommended data suppression guidelines; analysts are advised to adhere to any relevant public health unit policy or legislation.
- Data collection methodology may vary by public health unit, including online or telephone data collection, or a combination of the two methods.
- Sampling methodology may vary by public health unit, i.e., whether to utilize a census or a sample of mothers. Refer to 'LDCP Infant Feeding Surveillance Pilot Study: Final Report and Recommendations' for sample size calculations.[6]
- Public health units may choose to exclude participants who did not complete all three of the prospective questionnaires, or complete various combinations of prospective questionnaires and 6MRQ as laid out in 'LDCP Infant Feeding Surveillance Pilot Study: Final Report and Recommendations'[6] and 'Infant Feeding Surveillance Knowledge Translation Project: Summary Report of Public Health Unit Use of the 6-Month Retrospective Single Time Point Questionnaire.'[8]

Table 1. Relevant questions for any breastfeeding indicator based on responses on 2MPQ, 6MPQ or 12MPQ

2MPQ Questions	6MPQ Questions	12MPQ Questions
Q7: In the past week, what have you fed your baby? By this, we mean what milk?	Q5: In the past week, what have you fed your baby? By this, we mean what milk?	Q5: In the past week, have you provided breastmilk to your baby?
Q9: Since birth, have you attempted to breastfeed or provide breastmilk to your baby, even if only once?	Q7: Since the last time we talked to you, which was when your baby was approximately 2 months old, have you attempted to breastfeed or provide breastmilk to your baby, even if only once?	Q6: How old was your baby in months when you stopped breastfeeding?
Q10: How old was your baby in months when you stopped breastfeeding?	Q8: How old was your baby in months when you stopped breastfeeding?	---

Figure 1. Flowchart for any breastfeeding indicator calculation, 2MPQ
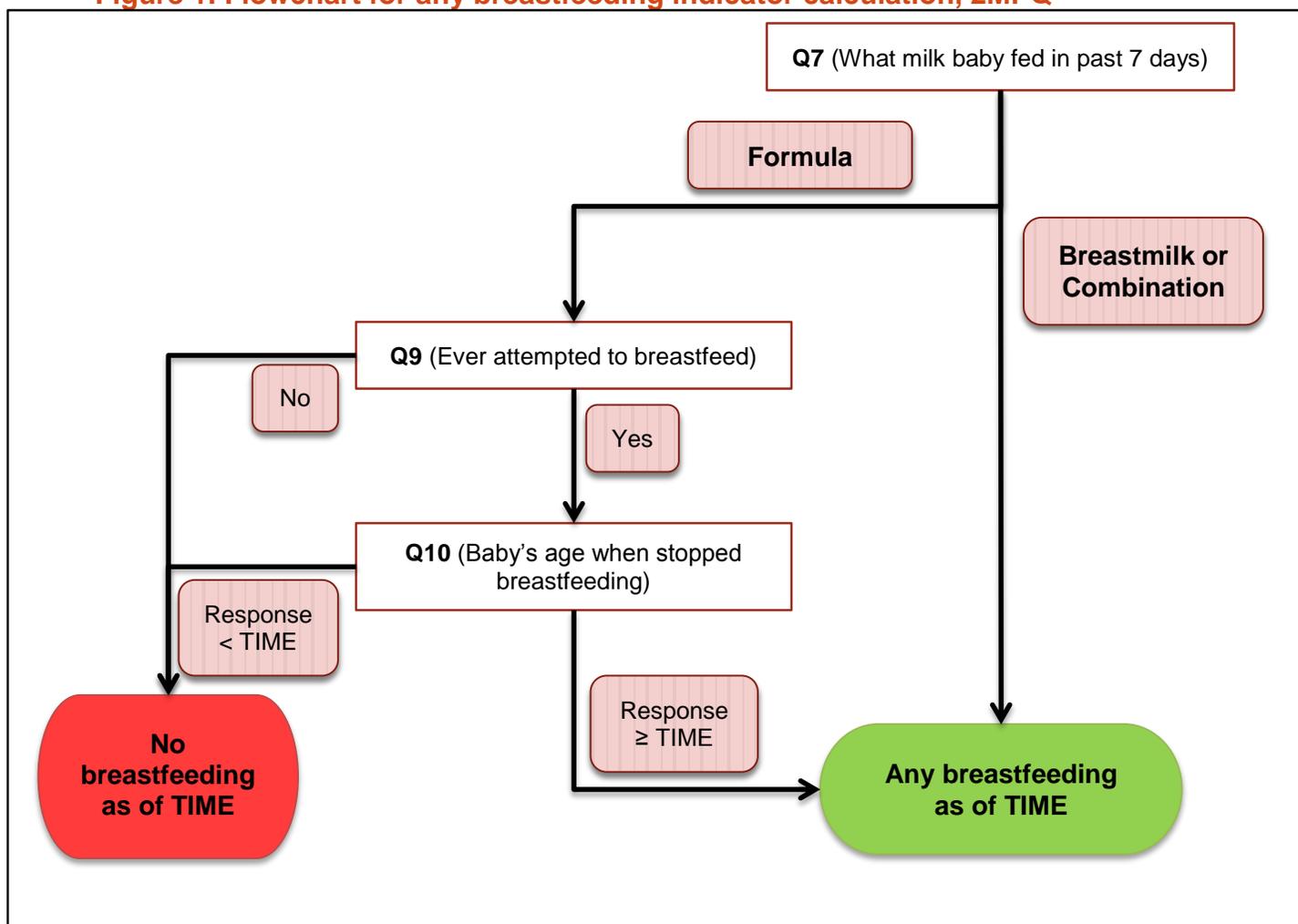
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Figure 2. Flowchart for any breastfeeding indicator calculation, 6MPQ
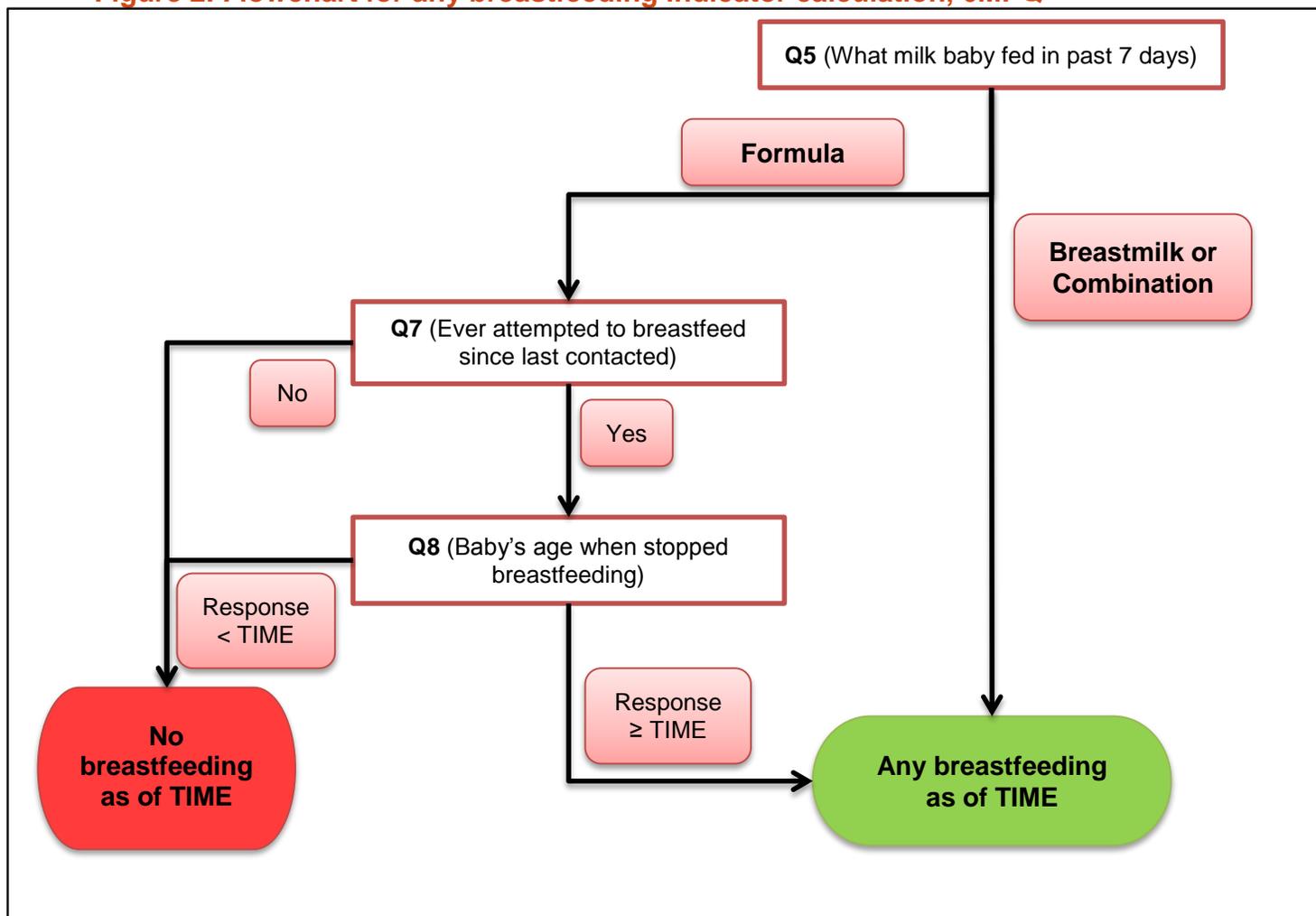
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Figure 3. Flowchart for any breastfeeding indicator calculation, 12MPQ
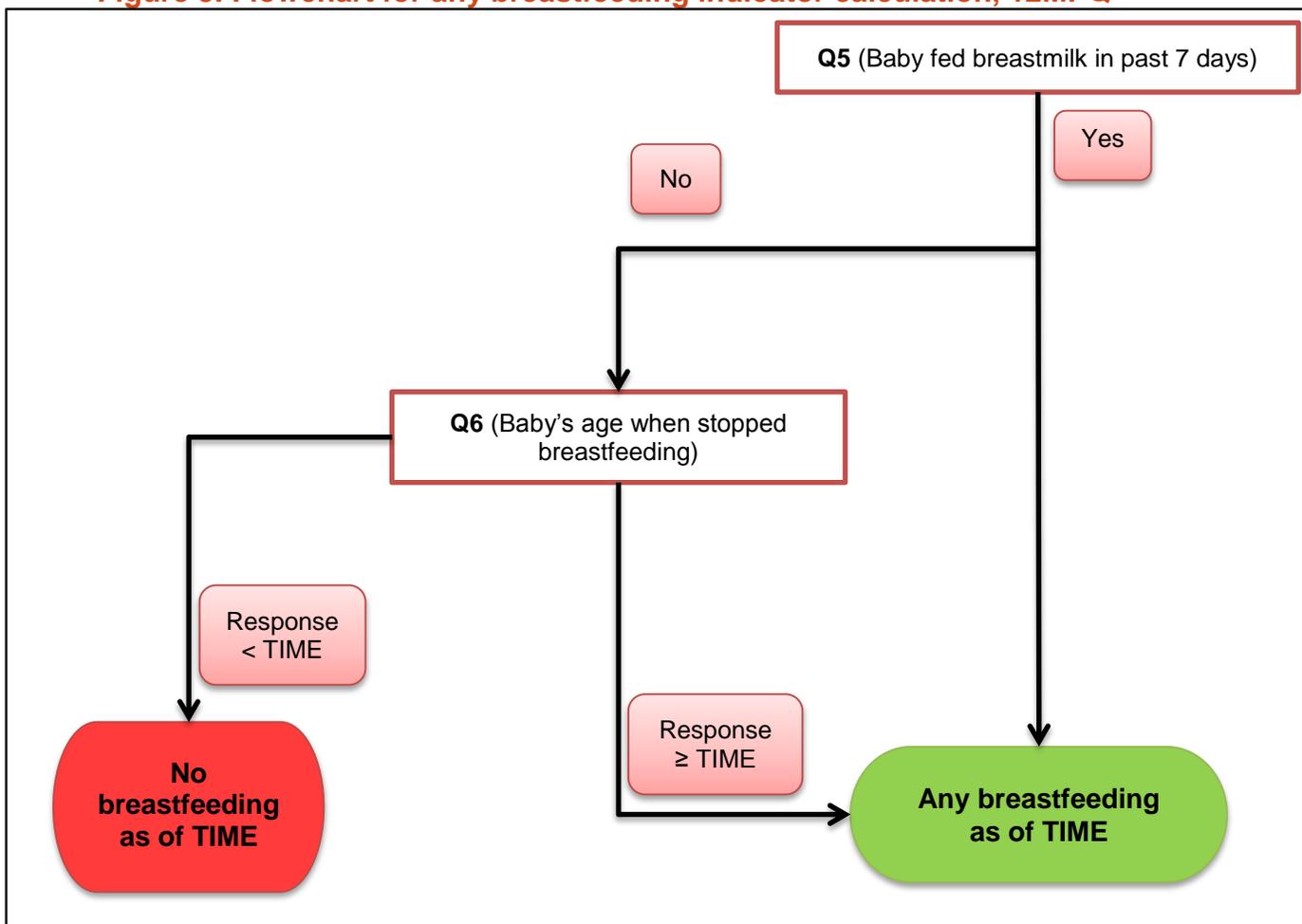
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Indicator comments

- The IFS PQ KE team recommends that stratified analyses be conducted at the discretion of the individual PHUs. Pre-defined indicators for sub-populations are not provided.
- It cannot be definitively determined if breastfeeding was initiated immediately after birth, or if there were periods when breastfeeding ceased temporarily. If the infant was only fed breastmilk in the past week, it must be assumed that they had also only been fed breastmilk at prior time points, unless responses indicate otherwise.

Ontario Public Health Standards (OPHS): Requirements for Programs, Services and Accountability

- The Ontario Public Health Standards (OPHS) "define the responsibilities of boards of health in an integrated health system and are informed by the core public health functions, which include: assessment and surveillance; health promotion and policy development; health protection; disease prevention; and emergency management."[9] The OPHS include four Foundational Standards and nine Program Standards that describe broad population health goals that result from the activities undertaken by boards of health and many others, including community partners, and governmental non-governmental organizations, and community members. The Standards also articulate program outcomes, which are directly the result of programs and services provided by boards of health, and often focus on changes in awareness, knowledge, attitudes, skills, practices, environments, and policies.[9] Boards of health are responsible for achieving these expected program outcomes. The Standards further outline the specific requirements including activities that boards of health must undertake. While some requirements are core public health functions, others can be flexibly implemented based on local context, and should be responsive to priority populations. Protocols and Guidelines named within some requirements further delineate how boards of health are expected to implement them.[9]

Population health assessment and/or surveillance program outcomes and requirements related to this indicator

Foundational Standards, Population Health Assessment

- Program Outcome: The board of health is aware of and uses data to influence and inform the development of local healthy public policy and its programs and services.[9]
- Requirement #1: The board of health shall conduct surveillance, including the ongoing collection, collation and periodic reporting of population health information, as required by the *Health Protection and Promotion Act* and in accordance with the *Population Health Assessment and Surveillance Protocol, 2018* (or as current).[9]
- Requirement #3: The board of health shall assess current health status, health behaviours, preventive health practices, risk and protective factors, health care utilization relevant to public health, and demographic indicators, including the assessment of trends and changes, in accordance with the *Population Health Assessment and Surveillance Protocol, 2018* (or as current).[9]

Healthy Growth and Development Program Standards

- Program Outcome: The board of health is aware of and uses data to influence and inform the development of local healthy public policy and its programs and services related to achieving optimal preconception, pregnancy newborn, child youth, parental and family health.[9]
- Requirement #1: The board of health shall collect and analyze relevant data to monitor trends over time, emerging trends, priorities, and health inequities related to healthy growth and development, and report and disseminate the data and information in accordance with the *Population Health Assessment and Surveillance Protocol, 2018* (or as current).[9]

Cross-references to other indicators/data sources

- Canadian Community Health Survey, 2015. Maternal experiences –(MEX) Module, Breastfeeding; MEX_Q115: How long did you breastfeed or give breast milk to [your last child]?[10]

Cited references

1. Breastfeeding Committee for Canada (BCC). (2017, June). Appendix 6.4: Calculation of Breastfeeding Rates: Community Health Services, p.38. In: The revised BFI 10 steps and WHO code indicators for hospitals and community health services. Retrieved December 28, 2017 from: http://www.breastfeedingcanada.ca/documents/Indicators%20-%20complete%20June%202017.pdf
2. M. Green, personal communication, May 18, 2016.
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4. Deming J & Caldarelli H. Infant Feeding Surveillance Prospective Questionnaires Standard Data Dictionary (Version 1, Release: April 2018). Appendix B of Infant Feeding Surveillance Prospective Questionnaires Knowledge Exchange Continuation LDCP User Guide and Report. Woodstock, Ontario, Canada.
5. APHEO Reproductive Health Core Indicator Working Group. (2016). Core Indicator: Infant Feeding. Retrieved February 9, 2018 from: http://www.apheo.ca/upload/membership/document/2017-10/infant-feeding-2.pdf#upload/membership/document/2017-10/infant-feeding-2.pdf
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www.publichealthontario.ca/en/ServicesAndTools/Documents/LDCP/LDCP_Breastfeeding_Project_Final_Report_2015.pdf

7. te Nyenhuis E, Deming J, Dupuis S, Fuller E, Harris A, White D, Yue C, and Folkema A. (2017). Infant Feeding Surveillance Knowledge Translation Project: Summary Report of Public Health Unit Use of the 6-Month Retrospective Single Time Point Questionnaire. Newmarket, Ontario, Canada. Retrieved February 2, 2018 from:
https://www.publichealthontario.ca/en/ServicesAndTools/Documents/LDCP/Breastfeeding%20KE%20deliverable%20-%20Final%20Report%20and%20guidance%20docs.pdf

8. Saha, S, Deming J, Caldarelli H. Infant Feeding Surveillance Prospective Questionnaires Statistical Syntax (Version 1.0 Release: April 2018). Appendices C-G of Infant Feeding Surveillance Prospective Questionnaires Knowledge Exchange Continuation LDCP User Guide. Woodstock, Ontario, Canada.

9. Ministry of Health and Long Term Care. (2017). Ontario Public Health Standards (OPHS): Requirements for Programs, Services and Accountability. Ministry of Health and Long Term Care: Toronto, Ontario, Canada.

10. Statistics Canada. (2016). CCHS 2015 Questionnaire. Retrieved February 2, 2018 from:
http://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&a=1&&lang=en&Item_Id=238890#qb244813

Acknowledgements

Changes made

Date	Type of review-Formal review or ad-hoc process	Changes made by	Description of changes

Exclusive Breastfeeding Core Indicators (Calculated using 2-month and 6-month Locally Driven Collaborative Project (LDCP) Multiple Time Point Questionnaires)

Description

- The proportion of babies who, as of <TIME>, were receiving human milk (including expressed milk, donor milk) and had not received formula or 'other liquids',[1] and had not been introduced to solid foods.
    - The 2 Month Prospective Questionnaire (2MPQ) does not ask about introduction of other liquids or solid foods, therefore the indicator calculation assumes no introduction has occurred, which may not be the case.
    - <TIME> may be equal to or less than the time point when the questionnaire was administered. If PHU has or is working towards Baby-Friendly Initiative (BFI) designation, a time point of 5.5 months may be used to evaluate breastfeeding rates 'at about' 6 months.[2,3] Common time points for reporting to the Breastfeeding Committee for Canada (BCC) include breastfeeding at 2 months, 4 months, 6 months and 12 months postpartum. Other time points may be chosen at the discretion of the PHU.
- The number of exclusively breastfed infants is the sum of:
    - current exclusive breastfeeding infants;
    - current formula feeding, if previous exclusive breastfeeding duration was greater than the time-point of interest; and
    - current combination feeding, if previous exclusive breastfeeding duration was greater than the time-point of interest.

Indicator and method of calculation

Specific Indicator

- Exclusive breastfeeding as of <TIME>.

Exclusive breastfeeding

$$\frac{\text{Total number of babies who, as of <TIME>, were receiving human milk (including expressed milk, donor milk) and had not received formula or 'other liquids', and had not been introduced to solid foods}}{\text{Total number of babies for whom the survey was completed}} * 100$$

Data notes

1. To evaluate breastfeeding rates at about 6 months, a time point of 5.5 months may be used.[2,3]
2. Solids can be introduced at 5.5 months or later.[2,3]
3. Refer to the derived variable dExcluded in the Infant Feeding Prospective Questionnaires (IFS PQ) Standard Data Dictionary (data dictionary) for exclusion criteria.[4]
4. Other liquids do not include vitamins or medications.

Reporting requirement

- If PHU has or is working towards BFI designation for community health services, surveillance requirements include recording data on entry to service and a minimum of two additional time frames (e.g., 2 or 'at about' 6 months[1-3]) and 12 months and beyond. Additional time frames are required if breastfeeding rates are less than 75% at entry to service.
- Data on breastfeeding at entry to service may be extracted from the Better Outcomes Registry and Network (BORN) Information System. It is recommended that PHUs use the **dimension Feeding at hospital or Midwifery Practice Group (MPG)** with the measure **# of births – discharged home or home births**.[5] See APHEO Core Indicator on Infant Feeding for more information.[5]

Indicator objectives

- To demonstrate the exclusive breastfeeding rate for babies at the PHU level.

Data sources

- **Numerator & denominator:** IFS 2-Month or 6-Month Multiple Time Point Questionnaires (prospective questionnaires).[6]
- **Suggested citation:** <Public Health Unit>, infant feeding surveillance data, collected using the IFS prospective questionnaires.
- **Core indicator documentation distributed by:** The IFS Prospective Questionnaires Knowledge Exchange (IFS PQ KE) LDCP team.

Analysis checklist

- The prospective questionnaires include at least two time points for which the exclusive breastfeeding indicator may be calculated: 2 months and 6 months. Given that BCC recommendations state that babies should be introduced to solid foods at around 6 months of age, exclusive breastfeeding is not expected to continue beyond this age, and thus exclusive breastfeeding rate calculation beyond 6 months is not necessary.[1]
- Questions used to calculate this indicator differ depending on which prospective questionnaire is used. Refer to the tables and figures below for the correct 2MPQ or 6MPQ illustrations.

- Refer to the IFS PQ data dictionary for coding variables.[4]
- Refer to the IFS PQ Cheat Sheet (Appendix C) and standard statistical syntax for calculating exclusive breastfeeding indicators in the statistical package of choice (STATA, SPSS, SAS, and R) (Appendices D-G) to calculate these indicators. Additional information and instructions on how to use and modify the syntax are included in these files.[7]
- Two analytical methods are provided in the statistical syntax:
  - Cross-sectional, including any respondent that completed either of the first two prospective questionnaires (2MPQ, 6MPQ), or,
  - Longitudinal, including only respondents who completed the first two prospective questionnaires time points.[7]
- There are pros and cons to each analytical method in terms of number of observations and generalizability. It is up to each PHU to establish which method is optimal for their population.
- If using a combination of IFS LDCP Prospective Questionnaires and 6MRQ, it will be necessary for the PHU to determine which elements from the two standard statistical syntax files (for STATA and SAS users) from each project to incorporate into final analysis.[7,8]

Notes

- There are no recommended data suppression guidelines; analysts are advised to adhere to any relevant public health unit policy or legislation.
- Data collection methodology may vary by public health unit, including online or telephone data collection, or a combination of the two methods.
- Sampling methodology may vary by public health unit, i.e., whether to utilize a census or a sample of mothers. Refer to 'LDCP Infant Feeding Surveillance Pilot Study: Final Report and Recommendations' for sample size calculations.[6]
- Public health units may choose to exclude participants who did not complete all three of the Prospective Questionnaires, or complete various combinations of Prospective Questionnaires and 6MRQ as laid out in 'LDCP Infant Feeding Surveillance Pilot Study: Final Report and Recommendations'[6] and 'Infant Feeding Surveillance Knowledge Translation Project: Summary Report of Public Health Unit Use of the 6-Month Retrospective Single Time Point Questionnaire.'[8]

Table 1. Relevant questions for exclusive breastfeeding indicator, pathways based on responses to Question 7, 2MPQ

1. Breastmilk	2. Formula	3. Combination of breastmilk and formula
Q7: In the past week, what have you fed your baby? By this, we mean what milk?	Q7: In the past week, what have you fed your baby? By this, we mean what milk?	Q7: In the past week, what have you fed your baby? By this, we mean what milk?
Q8: Since birth, including any time spent in hospital, has your baby ever been given any formula?	---	---
---	Q9: Since birth, have you attempted to breastfeed or provide breastmilk to your baby, even if only once?	---
---	Q10: How old was your baby in months when you stopped breastfeeding?	---
Q13: Was your baby given formula in hospital?	Q13: Was your baby given formula in hospital?	Q13: Was your baby given formula in hospital?
Q14: How old was your baby in months when they were first given formula?	Q14: How old was your baby in months when they were first given formula?	Q14: How old was your baby in months when they were first given formula?

Figure 1. Flowchart for exclusive breastfeeding indicator calculation (Q7=breastmilk), 2MPQ
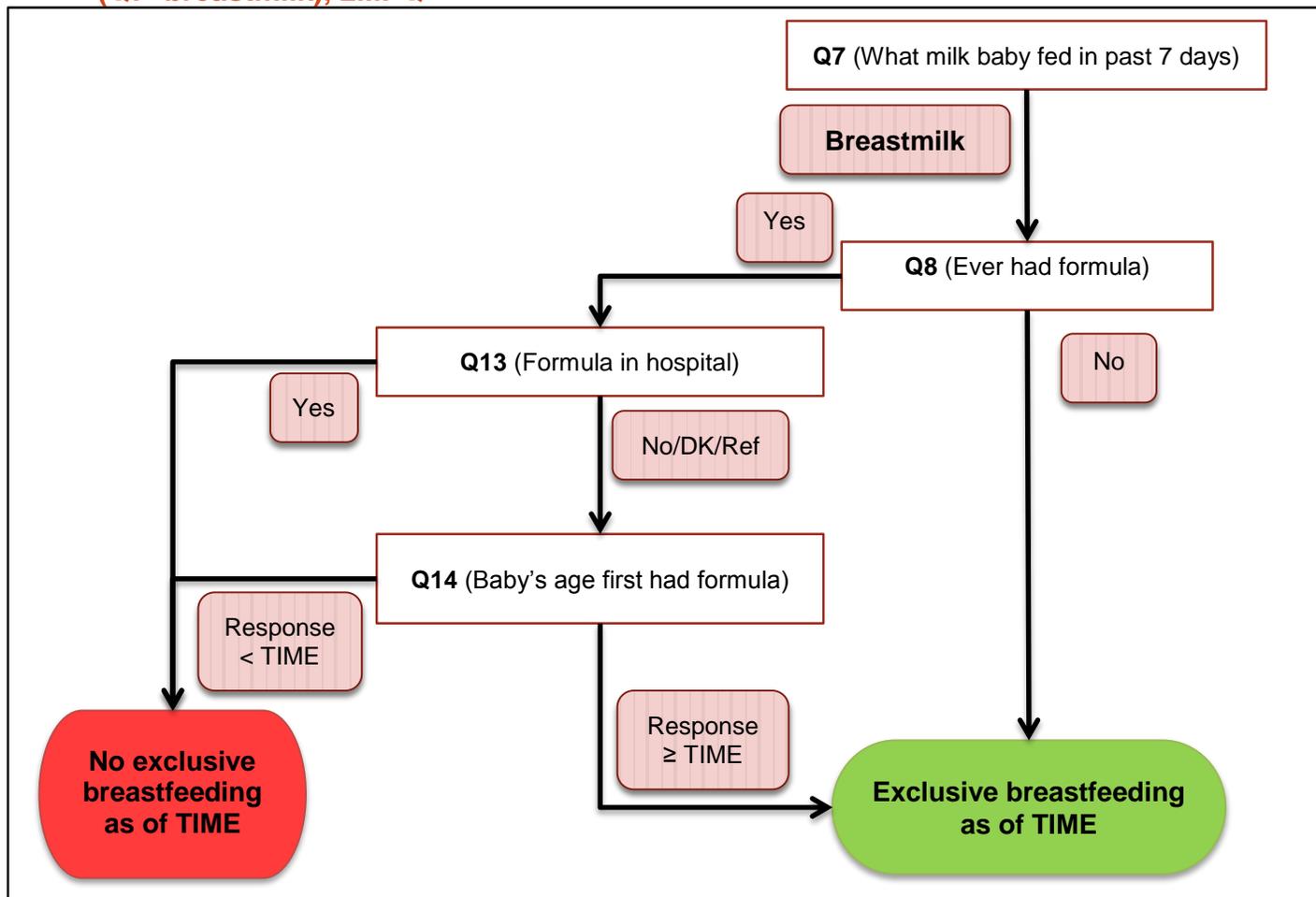
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Figure 2. Flowchart for exclusive breastfeeding indicator calculation (Q7=formula), 2MPQ
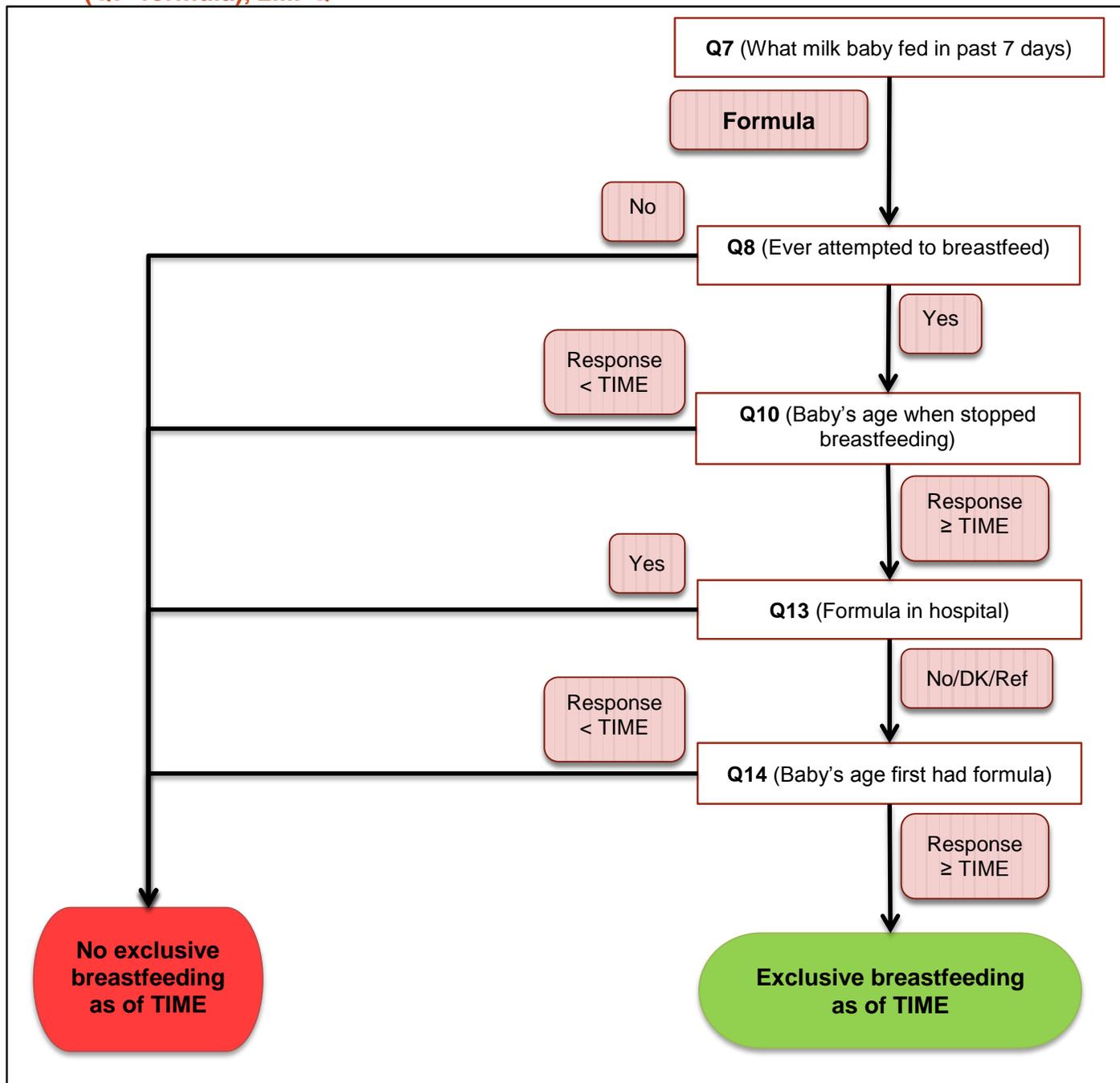
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Figure 3. Flowchart for exclusive breastfeeding indicator calculation (Q7=combination), 2MPQ
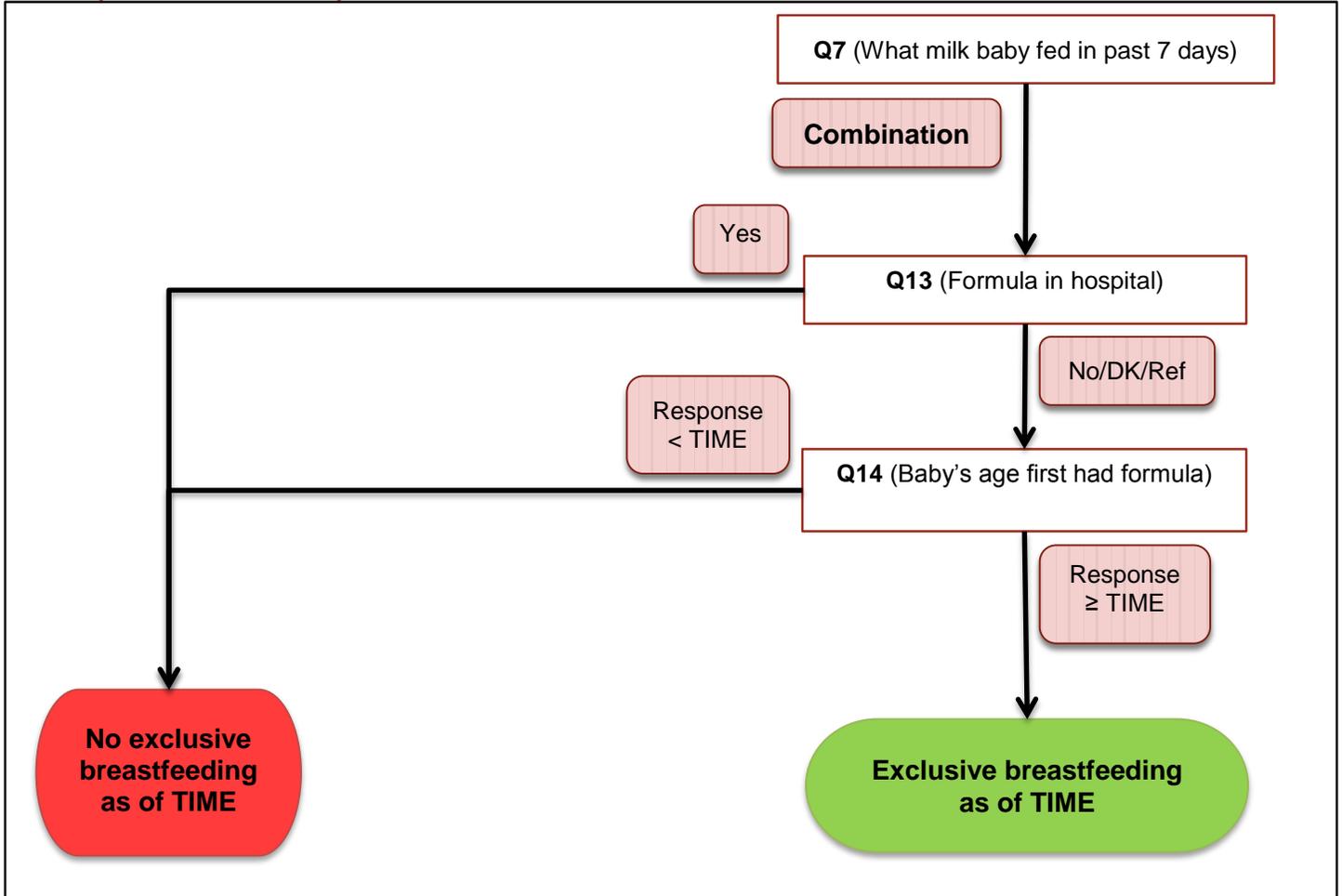
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Table 2. Relevant questions for exclusive breastfeeding indicator, pathways based on responses to Question 5, 6MPQ

1. Breastmilk	2. Formula	3. Combination of breastmilk and formula
Q5: In the past week, what have you fed your baby? By this, we mean what milk?	Q5: In the past week, what have you fed your baby? By this, we mean what milk?	Q5: In the past week, what have you fed your baby? By this, we mean what milk?
Q6: Since birth, including any time spent in hospital, has your baby ever been given any formula?	---	---
---	Q7: Since (last survey), have you attempted to breastfeed or provide breastmilk to your baby, even if only once?	---
---	Q8: How old was your baby in months when you stopped breastfeeding?	---
Q10: How old was your baby in months when they were first given formula?	Q10: How old was your baby in months when they were first given formula?	Q10: How old was your baby in months when they were first given formula?
Q20: Since birth, has your baby ever been given any liquids other than breastmilk or formula such as water, sugar water or juice?	Q20: Since birth, has your baby ever been given any liquids other than breastmilk or formula such as water, sugar water or juice?	Q20: Since birth, has your baby ever been given any liquids other than breastmilk or formula such as water, sugar water or juice?
Q22: How old was your baby in months the first time they were given liquids other than breastmilk or formula?	Q22: How old was your baby in months the first time they were given liquids other than breastmilk or formula?	Q22: How old was your baby in months the first time they were given liquids other than breastmilk or formula?
Q23: Since birth, has your baby ever been given any solid food such as meat, chicken, cereal, vegetables, or fruit?	Q23: Since birth, has your baby ever been given any solid food such as meat, chicken, cereal, vegetables, or fruit?	Q23: Since birth, has your baby ever been given any solid food such as meat, chicken, cereal, vegetables, or fruit?
Q24: How old was your baby in months the first time they were given any solid food such as such as meat, chicken, cereal, vegetables, or fruit?	Q24: How old was your baby in months the first time they were given any solid food such as meat, chicken, cereal, vegetables, or fruit?	Q24: How old was your baby in months the first time they were given any solid food such as such as meat, chicken, cereal, vegetables, or fruit?

Figure 4. Flowchart for exclusive breastfeeding indicator calculation (Q5=breastmilk), 6MPQ

Q5 (What milk baby fed in past 7 days)

Breastmilk

Yes

Q6 (Ever had formula)

No

Response < TIME

Response ≥ TIME

Q10 (Baby's age first had formula)

Yes

Q20 (Ever had any other liquids)

No

Response < TIME

Response ≥ TIME

Q22 (Baby's age first had other liquids)

Yes

No

Q23 (Ever had any solid food)

Response < TIME

Q24 (Baby's age first had solid food)

Response ≥ TIME

No

No exclusive breastfeeding as of TIME

Exclusive breastfeeding as of TIME
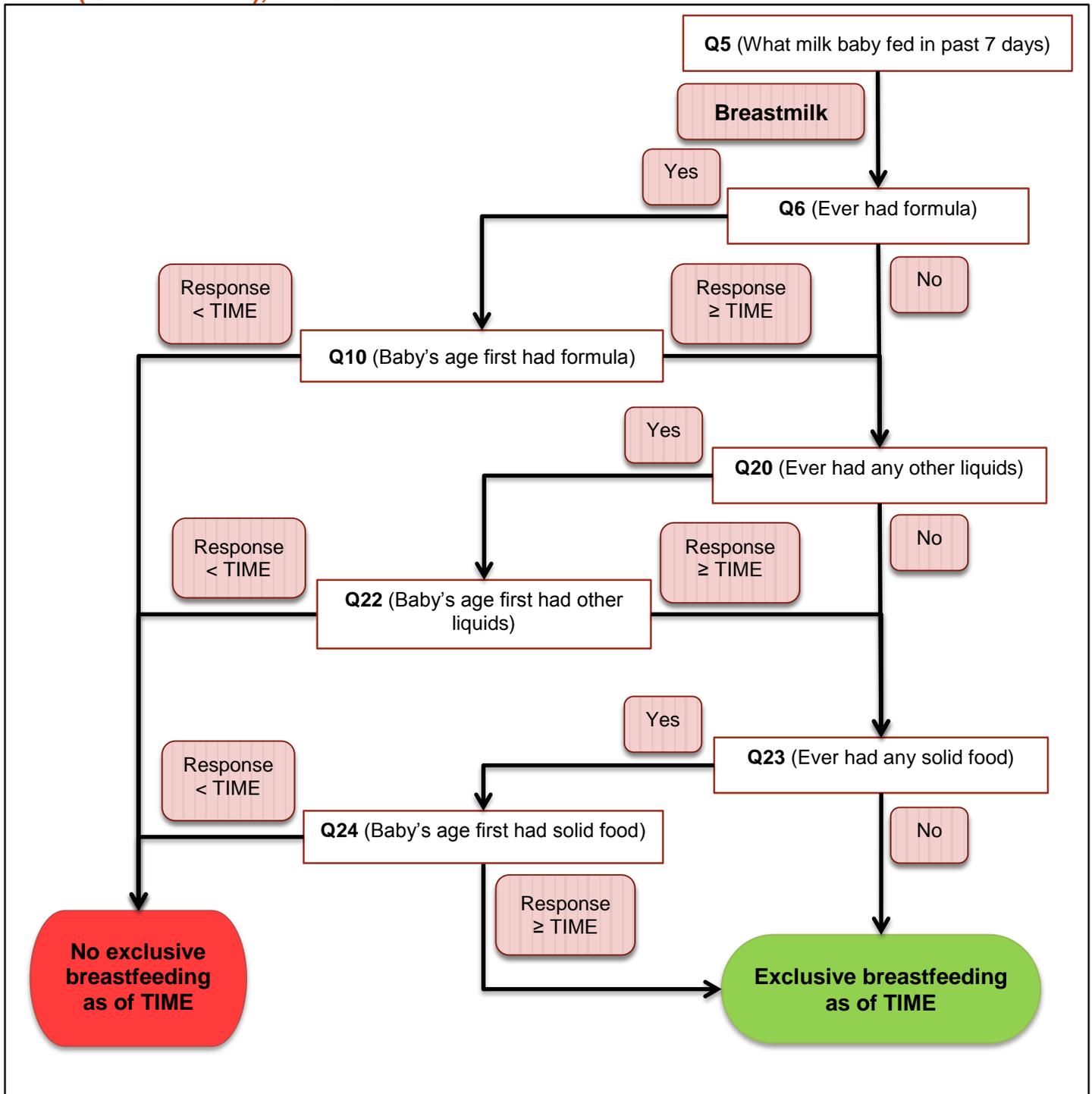
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Figure 5. Flowchart for exclusive breastfeeding indicator calculation (Q5=formula), 6MPQ
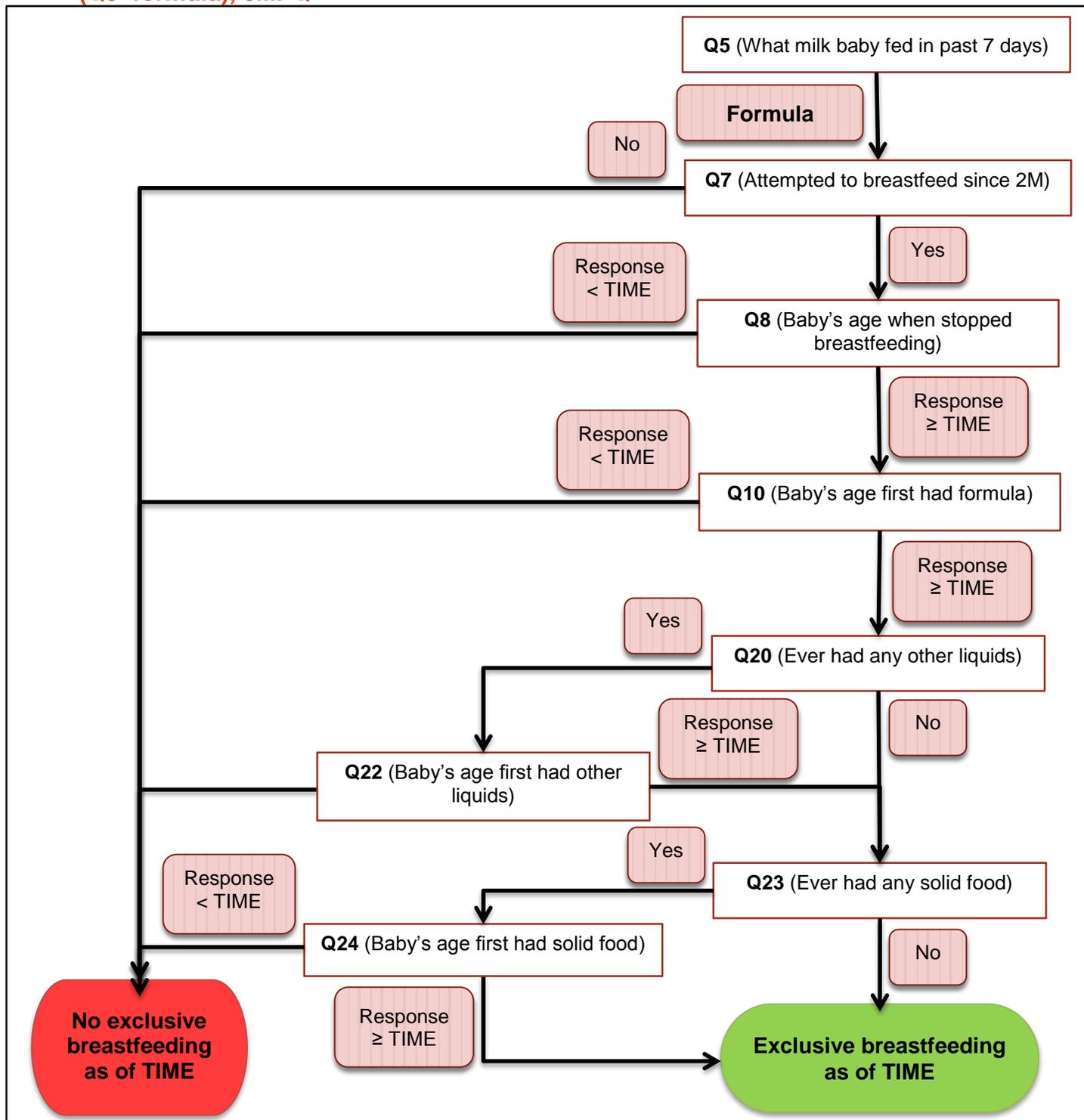
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Figure 6. Flowchart for exclusive breastfeeding indicator calculation (Q5=combination), 6MPQ
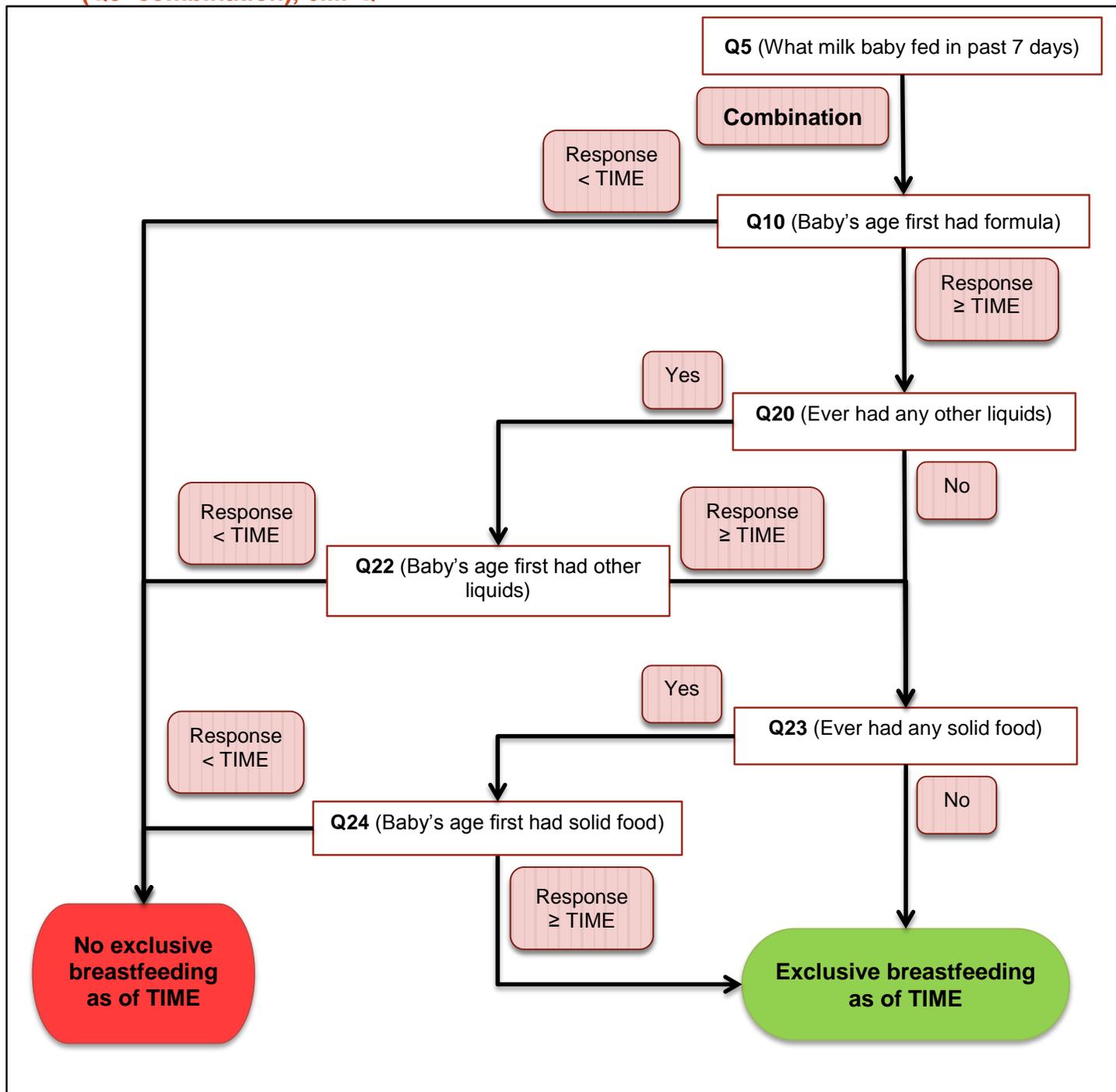
Note: Only questions and response options relevant to this indicator are depicted. TIME may be equal to or less than the time point when the questionnaire was administered.

Indicator comments

- The IFS PQ KE LDCP team recommends that stratified analyses be conducted at the discretion of the individual PHUs. Pre-defined indicators for sub-populations are not provided.
- It cannot be definitively determined if breastfeeding was initiated immediately after birth, or if there were periods when breastfeeding ceased temporarily. If the infant was only fed breastmilk in the past week, it must be assumed that they had also only been fed breastmilk at prior time points, unless responses indicate otherwise.

Ontario Public Health Standards (OPHS): Requirements for Programs, Services and Accountability

- The Ontario Public Health Standards (OPHS) "define the responsibilities of boards of health in an integrated health system and are informed by the core public health functions, which include: assessment and surveillance; health promotion and policy development; health protection; disease prevention; and emergency management."[9] The OPHS include four Foundational Standards and nine Program Standards that describe broad population health goals that result from the activities undertaken by boards of health and many others, including community partners, and governmental non-governmental organizations, and community members. The Standards also articulate program outcomes, which are directly the result of programs and services provided by boards of health, and often focus on changes in awareness, knowledge, attitudes, skills, practices, environments, and policies.[9] Boards of health are responsible for achieving these expected program outcomes. The Standards further outline the specific requirements including activities that boards of health must undertake. While some requirements are core public health functions, others can be flexibly implemented based on local context, and should be responsive to priority populations. Protocols and Guidelines named within some requirements further delineate how boards of health are expected to implement them.[9]

Population health assessment and/or surveillance program outcomes and requirements related to this indicator
Foundational Standards, Population Health Assessment

- Program Outcome: The board of health is aware of and uses data to influence and inform the development of local healthy public policy and its programs and services.[9]
- Requirement #1: The board of health shall conduct surveillance, including the ongoing collection, collation and periodic reporting of population health

information, as required by the *Health Protection and Promotion Act* and in accordance with the *Population Health Assessment and Surveillance Protocol, 2018* (or as current).[9]

- Requirement #3: The board of health shall assess current health status, health behaviours, preventive health practices, risk and protective factors, health care utilization relevant to public health, and demographic indicators, including the assessment of trends and changes, in accordance with the *Population Health Assessment and Surveillance Protocol, 2018* (or as current).[9]

Healthy Growth and Development Program Standards

- Program Outcome: The board of health is aware of and uses data to influence and inform the development of local healthy public policy and its programs and services related to achieving optimal preconception, pregnancy newborn, child youth, parental and family health.[9]
- Requirement #1: The board of health shall collect and analyze relevant data to monitor trends over time, emerging trends, priorities, and health inequities related to healthy growth and development, and report and disseminate the data and information in accordance with the *Population Health Assessment and Surveillance Protocol, 2018* (or as current).[9]

Cross-references to other indicators/data sources

- Canadian Community Health Survey, 2015. Maternal experiences – (MEX) Module, Breastfeeding; derived variables MEXDVBM6 - Exclusively breastfed for 6 months (or more) and MEXDVLBM - Length of exclusive breastfeeding.[10]

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Acknowledgements

Changes made

Date	Type of review-Formal review or ad-hoc process	Changes made by	Description of changes

Appendix B – Standard IFS PQ Data Dictionary

Click on the linked file icon below to access the Excel file.

LDCP PQs Data
Dictionary Revised Dr

Appendix C – Cheat Sheet for Statistical Syntax for Use with Prospective Questionnaires

"Cheat Sheet" for Prospective Questionnaires statistical syntax

This document contains a table of the prospective questionnaire questions used in syntax, summary of data file format requirements, Also summarized are the main macros used in the calculations of any and exclusive breastfeeding. Additional instructions to supplement what is in the syntax files on how to run Stata and SPSS programs are included here. SAS and R programs contain integrated instructions within each syntax file.

Table 1. Questions from each prospective questionnaire required for calculation

| Necessary variables for 2MPQ |
| --- |
| Q7 - In the past week, what have you fed your baby? By this, we mean what milk? |
| Q8 - Since birth, including any time spent in hospital, has your baby ever been given any formula? |
| Q9 - Since birth, have you attempted to breastfeed or provide breastmilk to your baby, even if only once? |
| Q10 - How old was your baby in months when you stopped breastfeeding? |
| Q13 - Was your baby given formula in hospital? |
| Q14 - How old was your baby in months when they were first given formula? |
| **Necessary variables for the 6MPQ** |
| Q5 - In the past week, what have you fed your baby? By this, we mean what milk? |
| Q6 - Since birth, including any time spent in hospital, has your baby ever been given any formula? |
| Q7 - Since the last time we contacted you, which was when your baby was about 2 months old, have you tried to breastfeed or provide breastmilk to your baby, even if only once? |
| Q8 - How old was your baby in months when you stopped breastfeeding? |
| Q10 - How old was your baby in months when they were first given formula? |
| Q20 - Since birth, has your baby ever been given liquids other than breastmilk or formula, such as water, sugar water or juice? Other liquids do not include vitamins or medications. |
| Q22 - How old was your baby in months the first time they were given liquids other than breastmilk or formula? |
| Q23 - Since birth, has your baby ever been given any solid food such as meat, chicken, cereal, vegetables, or fruit? |
| Q24 - How old was your baby, in months, the first time they were given any solid food, such as meat, chicken, cereal, vegetables, or fruit? |
| **Necessary variables for the 12MPQ** |
| Q5 - In the past week, have you provided breastmilk to your baby? |
| Q6 - How old was your baby in months when you stopped providing breastmilk? |

Note: If you have variable names other than those in the Prospective Questionnaires Standard Data Dictionary (e.g., Q7), please replace these variables with the appropriate variable names in your own dataset. You have to insert new names in the data import steps. Also, ensure you have updated the file directory commands to the location/name of your own files in the data import steps.

Table 2. Data format required to import data in different software

Software	Required data format
Stata	.csv
SPSS	.xlsx
SAS	.csv
R	.csv

Table 3. List of general functions and their description

General functions	Description
anybf_2	Proportion of any breastfeeding at t months for 2 month survey
exclusivebf_2	Proportion of exclusive breastfeeding at t months for 2 month survey
anybf_6	Proportion of any breastfeeding at t months for 6 month survey
exclusivebf_6	Proportion of exclusive breastfeeding at t months for 6 month survey
anybf_12	Proportion of any breastfeeding at t months for 12 month survey
anybf_long1	Proportion of any breastfeeding at t months for common n (longitudinal)
exclusivebf_long1	Proportion of exclusive breastfeeding at t months for common n (longitudinal)

Instructions for using the Stata program to calculate any and exclusive breastfeeding proportions using LDCP IFS PQ data:

1. Save all the datasets, the program files "combined_program_stata.do" and "Import data and run.do" files in the same folder.

2. Open the "Import data and run.do" file.

3. Change the file path using the "cd" command on line 10.

4. Change the ".csv" file name when required using the "insheet" commands, e.g. on line 27.

5. Do not need to open any files to obtain the results other than "Import data and run.do" file.

Instructions to use the SPSS macros to calculate proportion of any breastfeeding and exclusive breastfeeding using LDCP IFS PQ data:

List of files provided:

a. IMPORT_DATA_MACRO_STANDARD.sps

b. CALCULATION_MACRO_STANDARD.sps

c. RESULT_VIEWER_STANDARD.sps

STEPS:

1) DO NOT open "CALCULATION_MACRO_STANDARD.sps" and "IMPORT_DATA_MACRO_STANDARD.sps" (These two files will be called by SPSS internally.)

2) OPEN "RESULT_VIEWER_STANDARD.sps".

3) On line 6, change the LOCATION of the file to where "IMPORT_DATA_MACRO_STANDARD.sps" file is saved. The location has to be within quotations. Do not change line 7.

4) On line 12, put the LOCATION and NAME of the datafile corresponding to 2 month dataset. The file has to be in .xlsx format. Entire file path (location + file name) has to be within quotations.

5) On line 13, change the name of the TAB of the excel file that has the dataset. The tab name has to be within quotations.

6) Change lines 19 and 20 accordingly for the 6 month dataset.

7) Change lines 26 and 27 accordingly for the 12 month dataset.

8) On line 36, change the LOCATION of the file where "CALCULATION_MACRO_STANDARD.sps" file is saved.

The location has to be within quotations. Do not change line 37.

9) Highlight and Run everything up to line 42. This will load all three datasets, merge them and load all the required macros.

10) Using line 49 and onwards, call different macros with different values of time. The result will be in the output window.

Appendix D – Stata Syntax to Calculate Any and Exclusive Breastfeeding Indicators

File 1

```
*************************************************************************************************
* The program to set up directory, load the LDCP Prospective Questionnaires data and run the code using  *
* the functions specified in combined_stata_program.do     Last modified: March 23, 2018
*
*************************************************************************************************

****** Specification of the directory where the .csv file and the program files are loaded *******
****** These specifications are needed only once in the whole file                 *******

*** Set Directory***
cd "C:\Users\Student\Desktop\Stata"

*** Read the do files of the programs ***
quietly do "combined_stata_program.do"


******************************************************************************************
* Task: Calculate any and exclusive breastfeeding indicators for 2months survey           *
******************************************************************************************

***** To clear the space and run the program ******
clear

set more off

**** Load The data. Change the data file (.csv file) names when required ***

insheet using "BFI_Online_Export_2mos_Jun2015_Dec2015_text.csv", case clear


***** Renaming the important variables (consistent with R, SAS and SPSS programs) ***

* If you have different variable names for 2month dataset, please replace, for example, Q4 with appropriate variable;


gen X2mth_03 = real(substr(Q3, 7, 7))
gen X2mth_04 = real(substr(Q4, 7, 7))
gen X2mth_07 = real(substr(Q7, 4, 4))
gen X2mth_08 = real(substr(Q8, 4, 4))
gen X2mth_09 = real(substr(Q9, 4, 4))
gen X2mth_10 = real(substr(Q10, 5, 5))
gen X2mth_13 = real(substr(Q13, 4, 4))
gen X2mth_14 = real(substr(Q14, 5, 5))

******* Exclude individuals who do not fullfil the inclusion criteria ******
*the intention is to exclude those with missing responses (e.g. don't know/refused) for necessary quesitons

drop if missing(X2mth_03) | missing(X2mth_04) | X2mth_04 == 2

keep ClientID ChildID X2mth_03 - X2mth_14


**** Run the program for any breast feeding at 2 months ***
*** The following 3 lines provide the proportion of any breast feeding at each time
*** point (months) from 0.5 (2 weeks) to 2.5 months  by 0.5 month increments (i.e., 2 weeks)
*** The values of i can be changed as required
```

```
***********************************************************************************************
*              CODE TO CALCULATE PROPORTION FOR DIFFERENT TIME POINTS
*
***********************************************************************************************

************ PROPORTION OF ANY BREAST FEEDING **********

******* For all time points **************
*!anybf_2 is a program defined in the combined_stata_program.do file
*!the macro `time' in the program anybf_2 in combined_stata_program.do is set to `i'
quietly gen anybf = .
forvalues i = 0.5(0.5)2.5{
anybf_2 `i'
}

**** For a specific time point (in months) the following code can be executed ***

**** To calculate proportion of any breast feeding at 1 month

*** To run the following code, please run the code above for all time points first ***
*! runs the program anybf_2 in combined_stata_program.do and the macro `time' in the
program
*!is set to whatever value follows anybf_2 in the line below
anybf_2 1

***** The value 1 can be changed as necessary ****


************ PROPORTION OF EXCLUSIVE FEEDING **********


**** Run the program for exclusive breast feeding at 2 months ***
*** The following 3 lines provide the proportion of exclusive breast feeding at each time
*** point (months) from 2 weeks to 2.5 months *** The values of i can be changed as required


***** For all time points ****
quietly gen exclusivebf = .
forvalues i = 0.5(0.5)2.5{
exclusivebf_2 `i'
    }


**** For a specific time point (in months) the following code can be executed ***

**** To calculate proportion of exclusive breast feeding at 1 month

*** To run the following code, please run the code above for all time points first ***
exclusivebf_2 1

***** The value 1 can be changed as necessary ****


***********************************************************************************************
*                                                              *
*              End of the program using 2 months survey                    *
*                                                              *
***********************************************************************************************
```

```
******************************************************************************************
* Task: Calculate any and exclusive breastfeeding indicators for 6 months survey     *
******************************************************************************************


***** Clear the space after finishing with the current task *******

***** To clear the space and running the program ******
clear

set more off

**** Load The data. Change the data file (.csv file) names when required ***

insheet using "BFI_Online_Export_6mos_Jun2015_Dec2015_text.csv", case clear

***** Renaming the important variables (consistent with R, SAS and SPSS programs) ***

* If you have different variable names for 6month, please replace, for example, Q4 with
appropriate variable;

gen X6mth_03 = real(substr(Q3, 7, .))
gen X6mth_04 = real(substr(Q4, 7, .))
gen X6mth_05 = real(substr(Q5, 4, .))
gen X6mth_06 = real(substr(Q6, 4, .))
gen X6mth_07 = real(substr(Q7, 8, .))
gen X6mth_08 = real(substr(Q8, 8, .))
gen X6mth_10 = real(substr(Q10, 10, .))
gen X6mth_20 = real(substr(Q20, 4, .))
gen X6mth_22 = real(substr(Q22, 10, .))
gen X6mth_23 = real(substr(Q23, 4, .))
gen X6mth_24 = real(substr(Q24, 4, .))


*** Exclude observations which don't meet criteria
drop if missing(X6mth_03) | missing(X6mth_04) | X6mth_04 == 2 | missing(X6mth_05)

keep ClientID ChildID X6mth_03 - X6mth_24


******************************************************************************************************
*                  CODE TO CALCULATE PROPORTION AT DIFFERENT TIME POINTS
******************************************************************************************************

************ PROPORTION OF ANY BREAST FEEDING **********

******* For all time points **************

**** Run the program for any breast feeding at 6 months ***
*** The following 3 lines provide the proportion of any breast feeding at each time
*** point (months) from 2 - 6.5 months
*** The values of i can be changed as required

quietly gen anybf = .
forvalues i = 2(0.5)6.5{
anybf_6 `i'
}

**** For a specific time point (in months) the following code can be executed ***

**** To calculate proportion of any breast feeding at 4 months

*** To run the following code, please run the code above for all time points first ***

anybf_6 4
```

************ PROPORTION OF EXCLUSIVE FEEDING **********

**** Run the program for exclusive breast feeding at 6 months ***
*** The following 3 lines provide the proportion of any breast feeding at each time
*** point (months) from 2 - 6.5 months
*** The values of i can be changed as required

```
quietly gen exclusivebf = .
forvalues i = 2(0.5)6.5{
exclusivebf_6 `i'
    }
```

**** For a specific time point (in months) the following code can be executed ***

**** To calculate proportion of exclusive breast feeding at 4 months

*** To run the following code, please run the code above for all time points first ***

```
exclusivebf_6 4
```


```
***********************************************************************************************
*                                                    *
*              End of the program using 6 months survey                      *
*                                                    *
***********************************************************************************************
```



```
***********************************************************************************
* Task: Calculate any breastfeeding indicators for 12 months survey           *
..................................................................................
***********************************************************************************
```

***** Clear the space after finishing with the current task *******

```
***** To clear the space and running the program ******
clear

set more off
```

**** Load The data. Change the data file (.csv file) names when required ***

```
insheet using "BFI_Online_Export_12mos_Jun2015_Dec2015_text.csv", case clear
```


***** Renaming the important variables (consistent with R, SAS and SPSS programs) ***
* If you have different variable names for 12month, please replace, for example, Q4 with
appropriate variable;


```
gen X12mth_03 = real(substr(Q3, 7, .))
gen X12mth_04 = real(substr(Q4, 7, .))
gen X12mth_05 = real(substr(Q5, 10, .))
gen X12mth_06 = real(substr(Q6, 10, .))
```

```
*** Exclude observations which don't meet criteria
drop if missing(X12mth_03) | missing(X12mth_04) | X12mth_04 == 2 | missing(X12mth_05)
```

```
************************************************************************************************
*                CODE TO CALCULATE PROPORTION AT DIFFERENT TIME POINTS
*
************************************************************************************************

************ PROPORTION OF ANY BREAST FEEDING **********

******* For all time points **************
```

```
**** Run the program for any breast feeding at 12 months ***
*** The following 3 lines provide the proportion of any breast feeding at each time
*** point (months) from 6 - 12.5 months
*** The values of i can be changed as required
quietly gen anybf = .
forvalues i = 6(0.5)12.5{
anybf_12 `i'
}
```

```
**** For a specific time point (in months) the following code can be executed ***

**** To calculate proportion of any breast feeding at 8 months

*** To run the following code, please run the code above for all time points first ***
anybf_12 8
```

```
****************************************************************************************************
*                                                              *
*              End of the program using 12 months survey                    *
*                                                              *
****************************************************************************************************
```

```
*********************************************************************************************
* Task: Calculate any and exclusive breastfeeding indicators for for participants       *
* completed all three surveys (longitudinal)                               *
*********************************************************************************************
```

```
***** Clear the space after finishing with the current task *******

***** To clear the space and running the program ******
clear

set more off

**** For the case of longitudinal calculations we have to merge three datasets ***

**** First load the file for 2 months change variable names and types ****

insheet using "BFI_Online_Export_2mos_Jun2015_Dec2015_text.csv", case clear
```

```
***** Renaming the important variables (consistent with R) ***
* If you have different variable names for 2month, please replace, for example, Q4 with
appropriate variable;
```

```
gen X2mth_03 = real(substr(Q3, 7, 7))
gen X2mth_04 = real(substr(Q4, 7, 7))
gen X2mth_07 = real(substr(Q7, 4, 4))
gen X2mth_08 = real(substr(Q8, 4, 4))
gen X2mth_09 = real(substr(Q9, 4, 4))
gen X2mth_10 = real(substr(Q10, 5, 5))
```

```
gen X2mth_13 = real(substr(Q13, 4, 4))
gen X2mth_14 = real(substr(Q14, 5, 5))
```

***** Remove the individuals who don't meet inclusion criteria ****

```
drop if missing(X2mth_03) | missing(X2mth_04) | X2mth_04 == 2
```

***** Depending on the version of Stata there might be restriction on how many variables
***** can be loaded. Thus in the next line only the variables required for calculation are kept.

```
keep ClientID ChildID X2mth_03 - X2mth_14
```

**** Save the data (.dta file) for later merging ***

```
save data_2, replace
```

```
clear
```

********* Repeat the same procedure for 6 month data *********

**** Read The 6 month data ***

```
insheet using "BFI_Online_Export_6mos_Jun2015_Dec2015_text.csv", case clear
```

```
gen X6mth_03 = real(substr(Q3, 7, .))
gen X6mth_04 = real(substr(Q4, 7, .))
gen X6mth_05 = real(substr(Q5, 4, .))
gen X6mth_06 = real(substr(Q6, 4, .))
gen X6mth_07 = real(substr(Q7, 8, .))
gen X6mth_08 = real(substr(Q8, 8, .))
gen X6mth_10 = real(substr(Q10, 10, .))
gen X6mth_20 = real(substr(Q20, 4, .))
gen X6mth_22 = real(substr(Q22, 10, .))
gen X6mth_23 = real(substr(Q23, 4, .))
gen X6mth_24 = real(substr(Q24, 4, .))
```

```
drop if missing(X6mth_03) | missing(X6mth_04) | X6mth_04 == 2 | missing(X6mth_05)
```

**** Keep important variables since all the variables are not needed *****

```
keep ClientID ChildID X6mth_03 - X6mth_24
```

**** Save the data for later merging ***

```
save data_6, replace
```

```
clear
```

*********** Finally load the 12 month data *************

```
insheet using "BFI_Online_Export_12mos_Jun2015_Dec2015_text.csv", case clear
```

***** Renaming the important variables (consistent with R) ***

```
gen X12mth_03 = real(substr(Q3, 7, .))
gen X12mth_04 = real(substr(Q4, 7, .))
gen X12mth_05 = real(substr(Q5, 10, .))
gen X12mth_06 = real(substr(Q6, 10, .))
```

```
*** Exclude observations which don't meet criteria
drop if missing(X12mth_03) | missing(X12mth_04) | X12mth_04 == 2 | missing(X12mth_05)

**** Keep important variables since all the variables are not needed *****

keep ClientID ChildID X12mth_03 - X12mth_06

**** Save the data for later merging ***

save data_12, replace

************** Merging the three datasets ***************

***** Merge 6 month data with the 12 month data ****

merge 1:m ClientID using data_6  , nogenerate

***** Merge the combined 6 and 12 month data with the 2 month data *****

merge 1:m ClientID using data_2  , nogenerate


****** In case there are still some people who don't meet inclusion criteria drop them *****

drop if missing(X2mth_03) | missing(X2mth_04) | missing(X6mth_03) | missing(X6mth_04) |
missing(X12mth_03) | missing(X12mth_04)

*********************************************************************************************
*                  CODE TO CALCULATE PROPORTION AT DIFFERENT TIME POINTS
*
*********************************************************************************************

************ PROPORTION OF ANY BREAST FEEDING **********

******* For all time points **************

**** Finally run the program for any breast feeding for longitudinal data ***
*** The following 3 lines provides the proportion of any breast feeding on each time
*** point (months) from 0.5 (2 weeks) - 12.5 months
*** The values of i can be changed as required

quietly gen anybf = .
forvalues i = 0.5(2)12{
anybf_long `i'
}

**** For a specific time point (in months) the following code can be executed ***

**** To calculate proportion of any breast feeding at 6 months

*** To run the following code, please run the code above for all time points first ***
anybf_long 6


************ PROPORTION OF EXCLUSIVE BREAST FEEDING **********

*** The following 3 lines provides the proportion of any breast feeding on each time
*** point (months) from 0.5 (2 weeks) - 6.5 months
*** The values of i can be changed as required

quietly gen exclusivebf = .
forvalues i = 0.5(2)6{
exclusivebf_long `i'
}
```

**** For a specific time point (in months) the following code can be executed ***

**** To calculate proportion of exclusive breast feeding at 4 months

*** To run the following code, please run the code above for all time points first ***
exclusivebf_long 4

File 2

```
********************************************************************************
* Task: Calculate any and exclusive breastfeeding indicators using using           *
* 2months, 6months and 12months LDCP Prospective Questionnaires.          *
* Last modified: March 23, 2018                                    *
* Cross sectional macros: anybf_2, exclusivebf_2, anybf_6, exclusivebf_6       *
*                                      and anybf_12    *
* Macros for longitudinal calculations: anybf_long, exclusivebf_long          *
********************************************************************************


* The following Stata syntax will calculate proportion of any and exclusive breastfeeding
* at a given time (in months). The syntax is based on the variables that
* are provided in the surveys datasets.
*
* Necessary variables for the 2_month survey:
*the intention is to exclude those with missing responses (e.g. don't know/refused) for
necessary quesitons
*
* Q7 - In the past week, what have you fed your baby? By this, we mean what milk?
* Q9 - Since birth, have you attempted to breastfeed or provide breastmilk to your baby, even if
only once?
* Q8 - Since birth, including any time spent in hospital, has your baby ever been given any
formula?
* Q10 - How old was your baby in months when you stopped breastfeeding?
* Q13 - Was your baby given formula in hospital?
* Q14 - How old was your baby in months when they were first given formula?
*
* Necessary variables for the 6_month survey:
*the intention is to exclude those with missing responses (e.g. don't know/refused) for
necessary quesitons

* Q5 - In the past week, what have you fed your baby? By this, we mean what milk?
* Q6 - Since birth, including any time spent in hospital, has your baby ever been given any
formula?
* Q7 - Since the last time we contacted you, which was when your baby was about 2 months
old, have you tried to breastfeed or provide breastmilk to your baby, even if only once?
* Q8 - How old was your baby in months when you stopped breastfeeding?
* Q10 - How old was your baby in months when they were first given formula?
* Q20 - Since birth, has your baby ever been given liquids other than  breastmilk or formula,
such as water, sugar water or juice? Other liquids do not include vitamins or medications.
* Q22 - How old was your baby in months the first time they were given liquids  other than
breastmilk or formula?
* Q23 - Since birth, has your baby ever been given any solid food such as meat, chicken,
cereal, vegetables, or fruit?
* Q24 - How old was your baby, in months, the first time they were given any solid food, such
as meat, chicken, cereal, vegetables, or fruit?
*
* Necessary variables for the 12_month survey:
*the intention is to exclude those with missing responses (e.g. don't know/refused) for
necessary quesitons

*  Q5 - In the past week, have you provided breastmilk to your baby?
*  Q6 - How old was your baby in months when you stopped providing  breastmilk?
```

* Please note this syntax is subject to further modification as necessary in the future.

*this syntax was tested in version 13.1 and version 15.1
*if you are using an earlier version of Stata, disable the version command (below)
*and check to see that the syntax works with your version of Stata. Once you have
*confirmed that the syntax works on your version, you can change the version command to whichever
*version of Stata you are using. This ensures that Stata will always roll back to the version you
*tested the syntax in before running the rest of the commands.
version 13.1


```
*******************************************************************************
*    Task: Calculate any and exclusive breastfeeding indicators for 2months survey       *
*******************************************************************************


program anybf_2
    *the next line tells stata to take the macroname `time' and assign it to the
    *first command line argument when the program anybf_2 is run in the Import data and run
file
    *for example,
    *quietly gen anybf = .
    *forvalues i = 0(0.5)2.5{
    *anybf_2 `i'
    *}
    *tells stata that `time' is set to `i' which loops through the values 0, 0.5, 1.0, 1.5, 2.0, 2.5
    *using the forvalues command
    args time
    if (`time' >= 3) {
    display as error "Time cannot be >= 3 months"
    exit 101
    *the preceeding three lines will generate the error msg if you try to assign a value to
    *the macro `time' in the anybf_2 program that is >=3 for example, if you ran
    *quietly gen anybf = .
    *forvalues i = 0(0.5)3.0{
    *anybf_2 `i'
    *}
    *or
    *anybf_2 3
    *you would get "Time cannot be >= 3 months"
    }

            **/* 1 = < 2 weeks        */
            **/* 2 = 2 weeks - < 1 month */
            **/* 3 = 1 - < 1.5 month    */
            **/* 4 = 1.5 - < 2 months   */
            **/* 5 = 2 - <2.5 months    */
            **/* 6 = 2.5 - < 3 months   */

            **** Create the time variable matching with the data set ******
    quietly gen t2 = .
    quietly replace t2 = 1 if (`time' >= 0 & `time' < 0.5)
    quietly replace t2 = 2 if (`time' >= 0.5 & `time' < 1)
    quietly replace t2 = 3 if (`time' >= 1 & `time' < 1.5)
    quietly replace t2 = 4 if (`time' >= 1.5 & `time' < 2)
    quietly replace t2 = 5 if (`time' >= 2 & `time' < 2.5)
    quietly replace t2 = 6 if (`time' >= 2.5 & `time' < 3)
```

```
***ANY BREASTFEEDING***
************************
drop anybf
quietly gen anybf = .

*********** Inserting the conditions *************************
*this section of code creates a dummy variable that is 1 for anyone that meets the definition of
any breastfeeding at a particular time point
*figures found in LDCP PQ Any Breastfeeding Core Indicator document
*see Figure 1. Flowchart for any breastfeeding indicator calculation, 2MPQ

quietly replace anybf = 1 if inlist(X2mth_07,1,3)
quietly replace anybf = 1 if X2mth_07 == 2 & X2mth_09 == 1 & ///
          (X2mth_10 >= t2 & X2mth_10 <= 6)

quietly replace anybf = 0 if X2mth_07 == 2 & X2mth_09 == 0
quietly replace anybf = 0 if X2mth_07 == 2 & X2mth_09 == 1 & ///
                              X2mth_10 < t2


*    display "The above table is proportion of any breastfeeding as of time-point `t2'"

    quietly summarize anybf
   display as text "Proportion of any breastfeeding after `time' months = " as result r(mean)

***** Drop variables which are no longer required *******
    drop t2
end



*************  Exclusive breastfeeding ********************

** The program **
program exclusivebf_2
    args time
    if (`time' >= 3) {
    display as error "Time cannot be >= 3 months"
    exit 101
    }

    **** Create the time variable matching with the data set ******

          **/* 1 = < 2 weeks          */
          **/* 2 = 2 weeks - < 1 month */
          **/* 3 = 1 - < 1.5 month     */
          **/* 4 = 1.5 - < 2 months    */
          **/* 5 = 2 - <2.5 months     */
          **/* 6 = 2.5 - < 3 months    */
    quietly gen t2 = .
    quietly replace t2 = 1 if (`time' >= 0 & `time' < 0.5)
    quietly replace t2 = 2 if (`time' >= 0.5 & `time' < 1)
    quietly replace t2 = 3 if (`time' >= 1 & `time' < 1.5)
    quietly replace t2 = 4 if (`time' >= 1.5 & `time' < 2)
    quietly replace t2 = 5 if (`time' >= 2 & `time' < 2.5)
    quietly replace t2 = 6 if (`time' >= 2.5 & `time' < 3)
```

EXCLUSIVE BREASTFEEDING
****

```
drop exclusive
quietly gen exclusivebf = .
```

*********** Inserting the conditions ************************
*figures found in LDCP PQ Exclusive Breastfeeding Core Indicator document

**** Pathway 1: When Baby had breast milk ****
*see Figure 1. Flowchart for exclusive breastfeeding indicator calculation (Q7=breastmilk), 2MPQ

```
quietly replace exclusivebf = 1 if X2mth_07 == 1 & X2mth_08 == 0
quietly replace exclusivebf = 1 if X2mth_07 == 1 & X2mth_08 ==1 & ///
                    X2mth_13==0 & (X2mth_14 >= t2 & X2mth_14 <= 6)
quietly replace exclusivebf = 0 if X2mth_07 == 1 & X2mth_08 == 1 & ///
                     X2mth_13 == 0 & X2mth_14 < t2
quietly replace exclusivebf = 0 if X2mth_07 == 1 & X2mth_08 == 1 & X2mth_13==1
```

**** Pathway 2: When Baby had formula ****
*see Figure 2. Flowchart for exclusive breastfeeding indicator calculation (Q7=formula), 2MPQ

```
quietly replace exclusivebf = 1 if X2mth_07 == 2 & X2mth_09 == 1 & ///
                     (X2mth_10 >= t2 & X2mth_10 <= 6) & X2mth_13==0 & (X2mth_14 >=
t2 & X2mth_14 <= 6)
quietly replace exclusivebf = 0 if X2mth_07 == 2 & X2mth_09 == 1 & X2mth_10 < t2
quietly replace exclusivebf = 0 if X2mth_07 == 2 & X2mth_09 == 0
quietly replace exclusivebf = 0 if X2mth_07 == 2 & X2mth_09 == 1 & ///
                     (X2mth_10 >= t2 & X2mth_10 <= 6) & X2mth_13==0 & (X2mth_14 <
t2)
quietly replace exclusivebf = 0 if X2mth_07 == 2 & X2mth_09 == 1 & X2mth_13==1
```

**** Pathway 3: When Baby had combination ****
*see Figure 3. Flowchart for exclusive breastfeeding indicator calculation (Q7=combination), 2MPQ

```
quietly replace exclusivebf = 1 if X2mth_07 == 3 & X2mth_13 == 0 &  (X2mth_14 >= t2 &
X2mth_14 <= 6)
quietly replace exclusivebf = 0 if X2mth_07 == 3 & X2mth_13 == 0 & (X2mth_14 < t2)
quietly replace exclusivebf = 0 if X2mth_07 == 3 & X2mth_13 == 1
```

```
*    display "The above table is proportion of any breastfeeding as of time-point `t2'"

    quietly summarize exclusivebf
   display as text "Proportion of exclusive breastfeeding after `time' months = " as result
r(mean)
    ***** Drop variables which are no longer required *******
    drop t2
end
```

****
*   *
*   End of the program using 2 months survey   *
*   *
****

```
*********************************************************************************************
*      Task: Calculate any and exclusive breastfeeding indicators for 6 months survey   *
*********************************************************************************************

** The program **
program anybf_6
    args time
    if (`time' < 2 | `time' >= 7) {
    display as error "Time cannot be < 2 months or >= 7 months"
    exit 101
    }

    **** Create the time variable matching with the data set ******

            **/* 1 = 2 - < 2.5 months        */
            **/* 2 = 2.5 - < 3 months        */
            **/* 3 = 3 - < 3.5 months        */
            **/* 4 = 3.5 - < 4 months        */
            **/* 5 = 4 - < 4.5 months        */
            **/* 6 = 4.5 - < 5 months        */
            **/* 7 = 5 - < 5.5 months        */
            **/* 8 = 5.5 - < 6 months        */
            **/* 9 = 6 - < 6.5 months        */
            **/* 10 = 6.5 - < 7 months        */

    quietly gen tb6  = .
    quietly replace tb6 = 1  if (`time' >= 2 & `time'   < 2.5)
    quietly replace tb6 = 2  if (`time' >= 2.5 & `time' < 3)
    quietly replace tb6 = 3  if (`time' >= 3 & `time'   < 3.5)
    quietly replace tb6 = 4  if (`time' >= 3.5 & `time' < 4)
    quietly replace tb6 = 5  if (`time' >= 4 & `time'   < 4.5)
    quietly replace tb6 = 6  if (`time' >= 4.5 & `time' < 5)
    quietly replace tb6 = 7  if (`time' >= 5 & `time'   < 5.5)
    quietly replace tb6 = 8  if (`time' >= 5.5 & `time' < 6)
    quietly replace tb6 = 9  if (`time' >= 6 & `time'   < 6.5)
    quietly replace tb6 = 10 if (`time' >= 6.5 & `time' < 7)


***ANY BREASTFEEDING***
************************
drop anybf
quietly gen anybf = .

*********** Inserting the conditions ************************
*figures found in LDCP PQ Any Breastfeeding Core Indicator document
*see Figure 2. Flowchart for any breastfeeding indicator calculation, 6MPQ

quietly replace anybf = 1 if inlist(X6mth_05,1,3)
quietly replace anybf = 1 if X6mth_05 == 2 & X6mth_07 == 1 & ///
        (X6mth_08 >= tb6 & X6mth_08 <= 10)

quietly replace anybf = 0 if X6mth_05 == 2 & X6mth_07 == 0
quietly replace anybf = 0 if X6mth_05 == 2 & X6mth_07 == 1 & ///
                            X6mth_08 < tb6


*    display "The above table is proportion of any breastfeeding as of time-point `tb6'"

    quietly summarize anybf
   display as text "Proportion of any breastfeeding after `time' months = " as result r(mean)
    ***** Drop variables which are no longer required *******
    drop tb6
end
```

```
** A program to create solid liquid consumption for children **
program solidliquid_6
    args time

*** Time when solid or liquid was introduced ***

    quietly gen tsl6  = .
    quietly replace tsl6 = 1  if (`time' >= 0 & `time'   < 0.5)
    quietly replace tsl6 = 2  if (`time' >= 0.5 & `time' < 1)
    quietly replace tsl6 = 3  if (`time' >= 1 & `time'   < 1.5)
    quietly replace tsl6 = 4  if (`time' >= 1.5 & `time' < 2)
    quietly replace tsl6 = 5  if (`time' >= 2 & `time'   < 2.5)
    quietly replace tsl6 = 6  if (`time' >= 2.5 & `time' < 3)
    quietly replace tsl6 = 7  if (`time' >= 3 & `time'   < 3.5)
    quietly replace tsl6 = 8  if (`time' >= 3.5 & `time' < 4)
    quietly replace tsl6 = 9  if (`time' >= 4 & `time'   < 4.5)
    quietly replace tsl6 = 10 if (`time' >= 4.5 & `time' < 5)
    quietly replace tsl6 = 11 if (`time' >= 5 & `time'   < 5.5)
    quietly replace tsl6 = 12 if (`time' >= 5.5 & `time' < 6)
    quietly replace tsl6 = 13 if (`time' >= 6 & `time'   < 6.5)
    quietly replace tsl6 = 14 if (`time' >= 6.5 & `time' < 7)

*** Indicator for exclusive breastfeeding ***

*********** Inserting the conditions ************************

quietly gen sl = .
quietly replace sl = 0 if X6mth_20 ==0 & X6mth_23 == 0
quietly replace sl = 0 if X6mth_20 ==0 & X6mth_23 == 1 & ///
                    (X6mth_24 >= tsl6 & X6mth_24 <= 14)
quietly replace sl = 0 if X6mth_20 == 1 & (X6mth_22 >= tsl6 & X6mth_22 <= 14) & ///
                    X6mth_23 == 0
quietly replace sl = 0 if X6mth_20 ==1 & (X6mth_22 >= tsl6 & X6mth_22 <= 14) & ///
                       X6mth_23 == 1 & (X6mth_24 >= tsl6 & X6mth_24 <= 14)

quietly replace sl = 1 if X6mth_20 ==0 & X6mth_23 == 1 & X6mth_24 < tsl6
quietly replace sl = 1 if X6mth_20 ==1 & X6mth_22 < tsl6
quietly replace sl = 1 if X6mth_20 ==1 &  (X6mth_22 >= tsl6 & X6mth_22 <= 14) & ///
                       X6mth_23 ==1 & X6mth_24 < tsl6

***** Drop variables which are no longer required *******

drop tsl6
end


** A program to create solid exclusive breast feeding after 6 months for children **
program exclusivebf_6
    args time
    if (`time' < 2 | `time' >= 7) {
    display as error "Time cannot be < 2 months or >= 7 months"
    exit 101
    }

    **** Create the time variable matching with the data set ******

            **/* 1 = < 2 weeks          */
            **/* 2 = 2 weeks - < 1 month */
            **/* 3 = 1 - < 1.5 month     */
            **/* 4 = 1.5 - < 2 months    */
            **/* 5 = 2 - <2.5 months     */
            **/* 6 = 2.5 - < 3 months    */
```

```
**/* 7 = 3 - < 3.5 months    */
**/* 8 = 3.5 - < 4 months    */
**/* 9 = 4 - < 4.5 months    */
**/* 10 = 4.5 - < 5 months    */
**/* 11 = 5- < 5.5 months    */
**/* 12 = 5.5 - < 6 months    */
**/* 13 = 6 - < 6.5 months    */
**/* 14 = 6.5 - < 7 months    */
****** Create two time variables ****
*** Time till breast feeding occurred ****
    quietly gen tb6  = .
    quietly replace tb6 = 1  if (`time' >= 2 & `time'   < 2.5)
    quietly replace tb6 = 2  if (`time' >= 2.5 & `time' < 3)
    quietly replace tb6 = 3  if (`time' >= 3 & `time'   < 3.5)
    quietly replace tb6 = 4  if (`time' >= 3.5 & `time' < 4)
    quietly replace tb6 = 5  if (`time' >= 4 & `time'   < 4.5)
    quietly replace tb6 = 6  if (`time' >= 4.5 & `time' < 5)
    quietly replace tb6 = 7  if (`time' >= 5 & `time'   < 5.5)
    quietly replace tb6 = 8  if (`time' >= 5.5 & `time' < 6)
    quietly replace tb6 = 9  if (`time' >= 6 & `time'   < 6.5)
    quietly replace tb6 = 10 if (`time' >= 6.5 & `time' < 7)


*** Time when formula was introduced ***

    quietly gen tf6  = .
    quietly replace tf6 = 1  if (`time' >= 0 & `time'   < 0.5)
    quietly replace tf6 = 2  if (`time' >= 0.5 & `time' < 1)
    quietly replace tf6 = 3  if (`time' >= 1 & `time'   < 1.5)
    quietly replace tf6 = 4  if (`time' >= 1.5 & `time' < 2)
    quietly replace tf6 = 5  if (`time' >= 2 & `time'   < 2.5)
    quietly replace tf6 = 6  if (`time' >= 2.5 & `time' < 3)
    quietly replace tf6 = 7  if (`time' >= 3 & `time'   < 3.5)
    quietly replace tf6 = 8  if (`time' >= 3.5 & `time' < 4)
    quietly replace tf6 = 9  if (`time' >= 4 & `time'   < 4.5)
    quietly replace tf6 = 10 if (`time' >= 4.5 & `time' < 5)
    quietly replace tf6 = 11 if (`time' >= 5 & `time'   < 5.5)
    quietly replace tf6 = 12 if (`time' >= 5.5 & `time' < 6)
    quietly replace tf6 = 13 if (`time' >= 6 & `time'   < 6.5)
    quietly replace tf6 = 14 if (`time' >= 6.5 & `time' < 7)


*** Calculation of Exclusive breast feeding ***
drop exclusivebf
quietly gen exclusivebf = .


*********** Inserting the conditions ************************.
*figures found in LDCP PQ Exclusive Breastfeeding Core Indicator document


*** Pathway 1: Where baby had breast milk ***
*see Figure 4. Flowchart for exclusive breastfeeding indicator calculation (Q5=breastmilk),
6MPQ

quietly replace exclusivebf = 1 if X6mth_05 == 1 & X6mth_06 == 0
quietly replace exclusivebf = 1 if X6mth_05 == 1 & X6mth_06 == 1 & (X6mth_10 >= tf6 &
X6mth_10 <=14)
quietly replace exclusivebf = 0 if X6mth_05 == 1 & X6mth_06 == 1 & X6mth_10 < tf6



*** Pathway 3: Where baby had formula ***
*see Figure 5. Flowchart for exclusive breastfeeding indicator calculation (Q5=formula), 6MPQ

quietly replace exclusivebf = 1 if X6mth_05 == 2 & X6mth_07 == 1 & ///
                    (X6mth_08 >= tb6 & X6mth_08 <=10) & ///
                    (X6mth_10 >= tf6 & X6mth_10 <=14)
quietly replace exclusivebf = 0 if X6mth_05 == 2 & X6mth_07 == 1 & X6mth_08 < tb6
```

```
quietly replace exclusivebf = 0 if X6mth_05 == 2 & X6mth_07 == 0
quietly replace exclusivebf = 0 if X6mth_05 == 2 & X6mth_07 == 1 & (X6mth_08 >= tb6 &
X6mth_08 <=10) & ///
                    X6mth_10 < tf6
```

*** Pathway 2: When baby had combination of breast feeding and formula ***
*see Figure 6. Flowchart for exclusive breastfeeding indicator calculation (Q5=combination),
6MPQ

```
quietly replace exclusivebf = 1 if X6mth_05 == 3 & (X6mth_10 >= tf6 & X6mth_10 <=14)
quietly replace exclusivebf = 0 if X6mth_05 == 3 & X6mth_10 < tf6
```

```
solidliquid_6 `time'
```

*** When children had solid liquid exclusivebf becomes 0 if they were 1 earlier ***
```
quietly replace sl = . if exclusivebf == .
```

```
quietly replace exclusivebf = 0 if sl == 1
```

*** When solid liquid is missing the exclusivebf should be missing ***

```
quietly replace exclusivebf = . if exclusivebf == 1 & sl == .
```

*display "The above table is proportion of exclusive breastfeeding as of time-point `time'
months"

```
    quietly summarize exclusivebf
  display as text "Proportion of exclusive breastfeeding after `time' months = " as result
r(mean)

    ***** Drop variables which are no longer required *******
    drop tb6 tf6 sl

end
```

```
********************************************************************************************
*                                                         *
*              End of the program using 6 months survey                    *
*                                                         *
********************************************************************************************
```

```
***********************************************************************************
*     Task: Calculate any breastfeeding indicators for 12 months survey              *
***********************************************************************************

program anybf_12
    args time
    if (`time' < 6 | `time' >= 13) {
    display as error "Time cannot be < 2 months or >= 7 months"
    exit 101
    }

    **** Create the time variable matching with the data set ******

            **/* 1  = 6 - < 6.5 months   */
            **/* 2  = 6.5 - < 7 months   */
            **/* 3  = 7 - < 7.5 month    */
```

```
             **/* 4  = 7.5 - < 8 months    */
             **/* 5  = 8 - < 8.5 months    */
             **/* 6  = 8.5 - < 9 months    */
             **/* 7  = 9 - < 9.5 months    */
             **/* 8  = 9.5 - < 10 months   */
             **/* 9  = 10 - < 10.5 months  */
             **/* 10 = 10.5 - < 11 months  */
             **/* 11 = 11- < 11.5 months   */
             **/* 12 = 11.5 - < 12 months  */
             **/* 13 = 12 - < 12.5 months  */
             **/* 14 = 12.5 - < 13 months  */


    quietly gen t12  = .
    quietly replace t12 = 1   if (`time' >= 6 & `time'   < 6.5)
    quietly replace t12 = 2   if (`time' >= 6.5 & `time' < 7)
    quietly replace t12 = 3   if (`time' >= 7 & `time'   < 7.5)
    quietly replace t12 = 4   if (`time' >= 7.5 & `time' < 8)
    quietly replace t12 = 5   if (`time' >= 8 & `time'   < 8.5)
    quietly replace t12 = 6   if (`time' >= 8.5 & `time' < 9)
    quietly replace t12 = 7   if (`time' >= 9 & `time'   < 9.5)
    quietly replace t12 = 8   if (`time' >= 9.5 & `time' < 10)
    quietly replace t12 = 9   if (`time' >= 10 & `time'   < 10.5)
    quietly replace t12 = 10  if (`time' >= 10.5 & `time' < 11)
    quietly replace t12 = 11  if (`time' >= 11 & `time'   < 11.5)
    quietly replace t12 = 12  if (`time' >= 11.5 & `time' < 12)
    quietly replace t12 = 13  if (`time' >= 12 & `time'   < 12.5)
    quietly replace t12 = 14  if (`time' >= 12.5 & `time' < 13)



***ANY BREASTFEEDING***
***********************
drop anybf
quietly gen anybf = .

*********** Inserting the conditions *************************
*figures found in LDCP PQ Any Breastfeeding Core Indicator document
*see Figure 3. Flowchart for any breastfeeding indicator calculation, 12MPQ

quietly replace anybf = 1 if X12mth_05 == 1
quietly replace anybf = 1 if X12mth_05 == 0 & (X12mth_06 >= t12 & X12mth_06 <= 14)
quietly replace anybf = 0 if X12mth_05 == 0 &  X12mth_06< t12



*    display "The above table is proportion of any breastfeeding as of time-point `t12'"

    quietly summarize anybf
   display as text "Proportion of any breastfeeding after `time' months = " as result r(mean)

    ***** Drop variables which are no longer required *******
    drop t12
end


*********************************************************************************************
*                                                              *
*                End of the program using 12 months survey                    *
*                                                              *
*********************************************************************************************
```

```
*****************************************************************************************
* Task: Calculate any and exclusive breastfeeding indicators for for paticipants      *
* completed all three surveys: common n (longitudinal)                                *
*****************************************************************************************



program anybf_long_2
    args time

    **** Create the time variable matching with the data set ******

            **/* 1 = < 2 weeks         */
            **/* 2 = 2 weeks - < 1 month */
            **/* 3 = 1 - < 1.5 month    */
            **/* 4 = 1.5 - < 2 months   */
            **/* 5 = 2 - <2.5 months    */
            **/* 6 = 2.5 - < 3 months   */
    quietly gen t2 = 0
    quietly replace t2 = 1 if (`time' >= 0 & `time' < 0.5)
    quietly replace t2 = 2 if (`time' >= 0.5 & `time' < 1)
    quietly replace t2 = 3 if (`time' >= 1 & `time' < 1.5)
    quietly replace t2 = 4 if (`time' >= 1.5 & `time' < 2)
    quietly replace t2 = 5 if (`time' >= 2 & `time' < 2.5)
    quietly replace t2 = 6 if (`time' >= 2.5 & `time' < 3)


***ANY BREASTFEEDING***
************************

*quietly gen anybf2 = .

quietly replace anybf2 = 1 if inlist(X2mth_07,1,3)
quietly replace anybf2 = 1 if X2mth_07 == 2 & X2mth_09 == 1 & ///
        (X2mth_10 >= t2 & X2mth_10 <= 6)

quietly replace anybf2 = 0 if X2mth_07 == 2 & X2mth_09 == 0
quietly replace anybf2 = 0 if X2mth_07 == 2 & X2mth_09 == 1 & ///
                        X2mth_10 < t2

    ***** Drop variables which are no longer required *******

drop t2
end



*********************************** For 6 months Code ****************************************

program anybf_long_6
    args time

    **** Create the time variable matching with the data set ******

            **/* 1 = 2 - < 2.5 months       */
            **/* 2 = 2.5 - < 3 months       */
            **/* 3 = 3 - < 3.5 months       */
            **/* 4 = 3.5 - < 4 months       */
            **/* 5 = 4 - < 4.5 months       */
            **/* 6 = 4.5 - < 5 months       */
            **/* 7 = 5 - < 5.5 months       */
            **/* 8 = 5.5 - < 6 months       */
            **/* 9 = 6 - < 6.5 months       */
            **/* 10 = 6.5 - < 7 months       */
```

```
        quietly gen tb6  = 0
        quietly replace tb6 = 1  if (`time' >= 2 & `time'   < 2.5)
        quietly replace tb6 = 2  if (`time' >= 2.5 & `time' < 3)
        quietly replace tb6 = 3  if (`time' >= 3 & `time'   < 3.5)
        quietly replace tb6 = 4  if (`time' >= 3.5 & `time' < 4)
        quietly replace tb6 = 5  if (`time' >= 4 & `time'   < 4.5)
        quietly replace tb6 = 6  if (`time' >= 4.5 & `time' < 5)
        quietly replace tb6 = 7  if (`time' >= 5 & `time'   < 5.5)
        quietly replace tb6 = 8  if (`time' >= 5.5 & `time' < 6)
        quietly replace tb6 = 9  if (`time' >= 6 & `time'   < 6.5)
        quietly replace tb6 = 10 if (`time' >= 6.5 & `time' < 7)


***ANY BREASTFEEDING***
************************

*********** Inserting the conditions ************************

quietly replace anybf6 = 1 if inlist(X6mth_05,1,3)
quietly replace anybf6 = 1 if X6mth_05 == 2 & X6mth_07 == 1 & ///
          (X6mth_08 >= tb6 & X6mth_08 <= 10)

quietly replace anybf6 = 0 if X6mth_05 == 2 & X6mth_07 == 0
quietly replace anybf6 = 0 if X6mth_05 == 2 & X6mth_07 == 1 & ///
                        X6mth_08 < tb6

***** Drop variables which are no longer required *******

drop tb6
end



************************************** For 12 months Code **********************************

program anybf_long_12
    args time

    **** Create the time variable matching with the data set ******


            **/* 1  = 6 - < 6.5 months    */
            **/* 2  = 6.5 - < 7 months    */
            **/* 3  = 7 - < 7.5 month     */
            **/* 4  = 7.5 - < 8 months    */
            **/* 5  = 8 - < 8.5 months    */
            **/* 6  = 8.5 - < 9 months    */
            **/* 7  = 9 - < 9.5 months    */
            **/* 8  = 9.5 - < 10 months   */
            **/* 9  = 10 - < 10.5 months  */
            **/* 10 = 10.5 - < 11 months  */
            **/* 11 = 11- < 11.5 months   */
            **/* 12 = 11.5 - < 12 months  */
            **/* 13 = 12 - < 12.5 months  */
            **/* 14 = 12.5 - < 13 months  */

        quietly gen t12  = 0
        quietly replace t12 = 1   if (`time' >= 6 & `time'   < 6.5)
        quietly replace t12 = 2   if (`time' >= 6.5 & `time' < 7)
        quietly replace t12 = 3   if (`time' >= 7 & `time'   < 7.5)
        quietly replace t12 = 4   if (`time' >= 7.5 & `time' < 8)
        quietly replace t12 = 5   if (`time' >= 8 & `time'   < 8.5)
        quietly replace t12 = 6   if (`time' >= 8.5 & `time' < 9)
```

```
    quietly replace t12 = 7   if (`time' >= 9 & `time'   < 9.5)
    quietly replace t12 = 8   if (`time' >= 9.5 & `time' < 10)
    quietly replace t12 = 9   if (`time' >= 10 & `time'   < 10.5)
    quietly replace t12 = 10  if (`time' >= 10.5 & `time' < 11)
    quietly replace t12 = 11  if (`time' >= 11 & `time'   < 11.5)
    quietly replace t12 = 12  if (`time' >= 11.5 & `time' < 12)
    quietly replace t12 = 13  if (`time' >= 12 & `time'   < 12.5)
    quietly replace t12 = 14  if (`time' >= 12.5 & `time' < 13)


***ANY BREASTFEEDING***
************************

*********** Inserting the conditions ************************

quietly replace anybf12 = 1 if X12mth_05 == 1
quietly replace anybf12 = 1 if X12mth_05 == 0 & (X12mth_06 >= t12 & X12mth_06 <= 14)
quietly replace anybf12 = 0 if X12mth_05 == 0 &  X12mth_06< t12


***** Drop variables which are no longer required *******
drop t12
end



************************* The combined program ********************************************

* Steps :    if time is greater than or equal to 7 months, call 12month program;
*
*          if time is less than 7 months and greater than or equal to 3 months, call 12month
programs first,
*          then call the 6month for those participants who have missing indicator after running
12month program.
*
*          if time is less than 3 months, call 12month programs first, then call 6month program
for the missing participants,
*          and at the end call 2months program for rest of the missing participants after running
12month and 6month programs (if any).
*
************************************************************************************************
program anybf_long
args time

quietly gen anybf12 = .
quietly gen anybf6 = .
quietly gen anybf2 = .

if (`time' >= 7) {

anybf_long_12 `time'

}

if (`time' >=3  & `time' < 7) {

anybf_long_12 `time'

anybf_long_6 `time'

quietly replace anybf12 = anybf6 if missing(anybf12)

}

if (`time' < 3) {
```

```
anybf_long_12 `time'

anybf_long_6 `time'

anybf_long_2 `time'

quietly replace anybf12 = anybf6 if missing(anybf12)

quietly replace anybf12 = anybf2 if missing(anybf12)

}


    drop anybf
    quietly gen anybf = anybf12
    quietly summarize anybf
  display as text "Proportion of any breastfeeding after `time' months = " as result r(mean)

    ***** Drop variables which are no longer required *******
drop anybf12 anybf6 anybf2

end



*------------------------------------------------------------------------------------------*
*                                                                     *
*                   Program for exclusive breast feeding for common n (longitudinal)       *
*                                                                     *
*------------------------------------------------------------------------------------------*

*************************** All the programs create new variable any bf ***************************

************************************** For 2 months Code ***************************************


************* Exclusive breast feeding ********************

** The program **
program exclusivebf_long_2
    args time

    **** Create the time variable matching with the data set ******

            **/* 1 = < 2 weeks         */
            **/* 2 = 2 weeks - < 1 month */
            **/* 3 = 1 - < 1.5 month    */
            **/* 4 = 1.5 - < 2 months   */
            **/* 5 = 2 - <2.5 months    */
            **/* 6 = 2.5 - < 3 months   */
    quietly gen t2 = 0
    quietly replace t2 = 1 if (`time' >= 0 & `time' < 0.5)
    quietly replace t2 = 2 if (`time' >= 0.5 & `time' < 1)
    quietly replace t2 = 3 if (`time' >= 1 & `time' < 1.5)
    quietly replace t2 = 4 if (`time' >= 1.5 & `time' < 2)
    quietly replace t2 = 5 if (`time' >= 2 & `time' < 2.5)
    quietly replace t2 = 6 if (`time' >= 2.5 & `time' < 3)
```

```
***EXCLUSIVE BREASTFEEDING***
*****************************

*********** Inserting the conditions ************************

**** Pathway 1: When Baby had breast milk ****
quietly replace exclusivebf2 = 1 if X2mth_07 == 1 & X2mth_08 == 0
quietly replace exclusivebf2 = 1 if X2mth_07 == 1 & X2mth_08 ==1 & ///
                      X2mth_13==0 & (X2mth_14 >= t2 & X2mth_14 <= 6)
quietly replace exclusivebf2 = 0 if X2mth_07 == 1 & X2mth_08 == 1 & ///
                       X2mth_13 == 0 & X2mth_14 < t2
quietly replace exclusivebf2 = 0 if X2mth_07 == 1 & X2mth_08 == 1 & X2mth_13==1




**** Pathway 2: When Baby had formula ****
quietly replace exclusivebf2 = 1 if X2mth_07 == 2 & X2mth_09 == 1 & ///
                      (X2mth_10 >= t2 & X2mth_10 <= 6) & X2mth_13==0 & (X2mth_14 >=
t2 & X2mth_14 <= 6)
quietly replace exclusivebf2 = 0 if X2mth_07 == 2 & X2mth_09 == 1 & X2mth_10 < t2
quietly replace exclusivebf2 = 0 if X2mth_07 == 2 & X2mth_09 == 0
quietly replace exclusivebf2 = 0 if X2mth_07 == 2 & X2mth_09 == 1 & ///
                      (X2mth_10 >= t2 & X2mth_10 <= 6) & X2mth_13==0 & (X2mth_14 <
t2)
quietly replace exclusivebf2 = 0 if X2mth_07 == 2 & X2mth_09 == 1 & ///
                       (X2mth_10 >= t2 & X2mth_10 <= 6) & X2mth_13==1

**** Pathway 3: When Baby had combination ****
quietly replace exclusivebf2 = 1 if X2mth_07 == 3 & X2mth_13 == 0 &  (X2mth_14 >= t2 &
X2mth_14 <= 6)
quietly replace exclusivebf2 = 0 if X2mth_07 == 3 & X2mth_13 == 0 & (X2mth_14 < t2)
quietly replace exclusivebf2 = 0 if X2mth_07 == 3 & X2mth_13 == 1




***** Drop variables which are no longer required *******
drop t2
end




************************************** For 6 months Code ****************************************

program exclusivebf_long_6
    args time

    **** Create the time variable matching with the data set ******

            **/* 1 = < 2 weeks          */
            **/* 2 = 2 weeks - < 1 month */
            **/* 3 = 1 - < 1.5 month     */
            **/* 4 = 1.5 - < 2 months    */
            **/* 5 = 2 - <2.5 months     */
            **/* 6 = 2.5 - < 3 months    */
            **/* 7 = 3 - < 3.5 months    */
            **/* 8 = 3.5 - < 4 months    */
            **/* 9 = 4 - < 4.5 months    */
            **/* 10 = 4.5 - < 5 months    */
            **/* 11 = 5- < 5.5 months    */
            **/* 12 = 5.5 - < 6 months    */
            **/* 13 = 6 - < 6.5 months    */
            **/* 14 = 6.5 - < 7 months    */
****** Create two time variables ****
```

```
*** Time till breast feeding occurred ****
    quietly gen tb6  = 0
    quietly replace tb6 = 1  if (`time' >= 2 & `time'   < 2.5)
    quietly replace tb6 = 2  if (`time' >= 2.5 & `time' < 3)
    quietly replace tb6 = 3  if (`time' >= 3 & `time'   < 3.5)
    quietly replace tb6 = 4  if (`time' >= 3.5 & `time' < 4)
    quietly replace tb6 = 5  if (`time' >= 4 & `time'   < 4.5)
    quietly replace tb6 = 6  if (`time' >= 4.5 & `time' < 5)
    quietly replace tb6 = 7  if (`time' >= 5 & `time'   < 5.5)
    quietly replace tb6 = 8  if (`time' >= 5.5 & `time' < 6)
    quietly replace tb6 = 9  if (`time' >= 6 & `time'   < 6.5)
    quietly replace tb6 = 10 if (`time' >= 6.5 & `time' < 7)


*** Time when formula was introduced ***

    quietly gen tf6  = 0
    quietly replace tf6 = 1  if (`time' >= 0 & `time'   < 0.5)
    quietly replace tf6 = 2  if (`time' >= 0.5 & `time' < 1)
    quietly replace tf6 = 3  if (`time' >= 1 & `time'   < 1.5)
    quietly replace tf6 = 4  if (`time' >= 1.5 & `time' < 2)
    quietly replace tf6 = 5  if (`time' >= 2 & `time'   < 2.5)
    quietly replace tf6 = 6  if (`time' >= 2.5 & `time' < 3)
    quietly replace tf6 = 7  if (`time' >= 3 & `time'   < 3.5)
    quietly replace tf6 = 8  if (`time' >= 3.5 & `time' < 4)
    quietly replace tf6 = 9  if (`time' >= 4 & `time'   < 4.5)
    quietly replace tf6 = 10 if (`time' >= 4.5 & `time' < 5)
    quietly replace tf6 = 11 if (`time' >= 5 & `time'   < 5.5)
    quietly replace tf6 = 12 if (`time' >= 5.5 & `time' < 6)
    quietly replace tf6 = 13 if (`time' >= 6 & `time'   < 6.5)
    quietly replace tf6 = 14 if (`time' >= 6.5 & `time' < 7)

*** Calculation of Exclusive breast feeding ***

*********** Inserting the conditions ************************


*** Pathway 1: Where baby had breast milk ***
quietly replace exclusivebf6 = 1 if X6mth_05 == 1 & X6mth_06 == 0
quietly replace exclusivebf6 = 1 if X6mth_05 == 1 & X6mth_06 == 1 & (X6mth_10 >= tf6 &
X6mth_10 <=14)
quietly replace exclusivebf6 = 0 if X6mth_05 == 1 & X6mth_06 == 1 & X6mth_10 < tf6


*** Pathway 2: When baby had combination of breast feeding and formula ***
quietly replace exclusivebf6 = 1 if X6mth_05 == 3 & (X6mth_10 >= tf6 & X6mth_10 <=14)
quietly replace exclusivebf6 = 0 if X6mth_05 == 3 & X6mth_10 < tf6



*** Pathway 3: Where baby had formula ***
quietly replace exclusivebf6 = 1 if X6mth_05 == 2 & X6mth_07 == 1 & ///
                    (X6mth_08 >= tb6 & X6mth_08 <=10) & ///
                    (X6mth_10 >= tf6 & X6mth_10 <=14)
quietly replace exclusivebf6 = 0 if X6mth_05 == 2 & X6mth_07 == 1 & X6mth_08 < tb6
quietly replace exclusivebf6 = 0 if X6mth_05 == 2 & X6mth_07 == 0
quietly replace exclusivebf6 = 0 if X6mth_05 == 2 & X6mth_07 == 1 & (X6mth_08 >= tb6 &
X6mth_08 <=10) & ///
                    X6mth_10 < tf6



solidliquid_6 `time'
```

```
*** When children had solid liquid exclusivebf becomes 0 if they were 1 earlier ***
quietly replace sl = . if exclusivebf6 == .

quietly replace exclusivebf6 = 0 if sl == 1

*** When solid liquid is missing the exclusivebf should be missing ***

quietly replace exclusivebf6 = . if exclusivebf6 == 1 & sl == .


***** Drop variables which are no longer required *******
drop sl tb6 tf6

end


************************** The combined program for exclusive breastfeeding
**************************

program exclusivebf_long
args time

    if (`time' > 6.5) {
    display as error "Time cannot be < 2 months or >= 7 months"
    exit 101
    }

quietly gen exclusivebf6 = .
quietly gen exclusivebf2 = .


if (`time' > 2.5  & `time' <= 6.5) {

exclusivebf_long_6 `time'

}

if (`time' <= 2.5) {

exclusivebf_long_6 `time'

exclusivebf_long_2 `time'

quietly replace exclusivebf6 = exclusivebf2 if missing(exclusivebf6)

}

    drop exclusivebf
    quietly gen exclusivebf = exclusivebf6
    quietly summarize exclusivebf
   display as text "Proportion of exclusive breastfeeding after `time' months = " as result
r(mean)

    ***** Drop variables which are no longer required *******
drop exclusivebf6 exclusivebf2

end
```

Appendix E – SPSS Syntax to Calculate Any and Exclusive Breastfeeding Indicators

File 1

```
* Encoding: UTF-8.
/*SPSS Program to enter the data file directories into and to call the import data and
calculation macros. Also to enter the time points for analysis.
/*See Cheat sheet for prospective questionnaires for further instructions although instructions
also included below. Last revised March 25, 2018*/


/*Change the following line. Paste the LOCATION of the file named
IMPORT_DATA_MACRO.sps within quotations*/ *.
INSERT FILE='C:\Users\shahr\Dropbox\Breast Feeding\Standard Syntax\SPSS' +
                    '\IMPORT_DATA_MACRO_STANDARD.sps'.


/*Paste the location and file name of the 2MTH dataset within quotations. File has to be in .xlsx
format*/
/*beside SheetName, paste the excel tab name that has the data*/

!IMPORT_DATA FileName = "C:\Users\shahr\Dropbox\Breast Feeding\Standard
data\BFI_Online_Export_2mos_Jun2015_Dec2015_text.xlsx"
            SheetName = "BFI_Online_Export_2mos"
            Month = 2.


/*Paste the location and file name of the 6MTH dataset within quotations. File has to be in .xlsx
format*/
/*beside SheetName, paste the excel tab name that has the data*/
!IMPORT_DATA FileName = "C:\Users\shahr\Dropbox\Breast Feeding\Standard
data\BFI_Online_Export_6mos_Jun2015_Dec2015_text.xlsx"
            SheetName = "BFI_Online_Export_6mos"
            Month = 6.


/*Paste the location and file name of the 12MTH dataset within quotations. File has to be in
.xlsx format*/
/*beside SheetName, paste the excel tab name that has the data*/
!IMPORT_DATA FileName = "C:\Users\shahr\Dropbox\Breast Feeding\Standard
data\BFI_Online_Export_12mos_Jun2015_Dec2015_text.xlsx"
            SheetName = "BFI_Online_Export_12mos"
            Month = 12.


/*DO NOT RUN this following line, unless all three datasets (data_2mth, data_6mth and
data_12mth) are open as windows*/
/*DO NOT RUN this following line, unless all three datasets (data_2mth, data_6mth and
data_12mth) are open as windows*/
/*DO NOT RUN this following line, unless all three datasets (data_2mth, data_6mth and
data_12mth) are open as windows*/

/*Paste the LOCATION of the file CALCULATION_MACRO.sps within quotations */ *.

INSERT FILE='C:\Users\shahr\Dropbox\Breast Feeding\Standard Syntax\SPSS'+
                    '\CALCULATION_MACRO_STANDARD.sps'.


/*The following two lines will close all the outputs that have been created so far and open a
new output window*/*.
OUTPUT CLOSE Document1.    /*closing the outputs refering to all the macro code*/.
OUTPUT NEW.
```

```
/*####################################*/
/* Calculating CROSS-SECTIONAL measures*/
/*####################################*/

/*calling anybf_2 function with different time. TIME IS IN MONTHS. NOT the categories of the
surveys*/
!anybf_2 time=0.5.
!anybf_2 time=1.
!anybf_2 time=1.5.
!anybf_2 time=2.
!anybf_2 time=2.5.

/*calling exclusivebf_2 function with different time. TIME IS IN MONTHS. NOT the categories
of the surveys*/
!exclusivebf_2 time=0.5 debug=1.
!exclusivebf_2 time=1.
!exclusivebf_2 time=1.5.
!exclusivebf_2 time=2.
!exclusivebf_2 time=2.5.

/*calling anybf_6 function with different time. TIME IS IN MONTHS. NOT the categories of the
surveys*/
!anybf_6 time=6.5.
!anybf_6 time=6.
!anybf_6 time=5.5.
!anybf_6 time=5.
!anybf_6 time=4.
!anybf_6 time=3.


/*calling exclusivebf_6 function with different time. TIME IS IN MONTHS. NOT the categories
of the surveys*/
!exclusivebf_6 time=6.5.
!exclusivebf_6 time=6.
!exclusivebf_6 time=5.5.
!exclusivebf_6 time=5.
!exclusivebf_6 time=4.
!exclusivebf_6 time=3.


/*calling anybf_12 function with different time. TIME IS IN MONTHS. NOT the categories of the
surveys*/
!anybf_12 time=12.
!anybf_12 time=11.
!anybf_12 time=10.
!anybf_12 time=9.
!anybf_12 time=8.
!anybf_12 time=7.




/*####################################*/
/* Calculating LONGITUDINAL measures   */
/*####################################*/

/*calling anybf_long function with different time. TIME IS IN MONTHS. NOT the categories of
the surveys*/
!anybf_long time =12.
!anybf_long time =10.
!anybf_long time =8.
!anybf_long time =6.
!anybf_long time =4.
!anybf_long time =2.
```

/*calling exclusivebf_long function with different time. TIME IS IN MONTHS. NOT the categories of the surveys*/
!exclusivebf_long time =6.
!exclusivebf_long time =5.5.
!exclusivebf_long time =4.
!exclusivebf_long time =3.
!exclusivebf_long time =2.

File 2
* Encoding: UTF-8.
Program to import data and rename variables for IFS PQ data. Last modified March 25, 2018/

/*DO NOT CHANGE ANYTHING IN THIS FILE*/

/***/
/***/
/*A macro to read the data files.   */
/*Excel files has to be in .xlsx format   */
/*this macro takes three arguments: */
/*1) FileName= full file location including file name and extension inside quotation   */
/*2) SheetName= name of the tab of the excel file that contains data   */
/*3) Month= 2 or 6 or 12 depending on which survey the excel file is associated to   */

/* Necessary variables for the 2_month survey */

/* Q7 - In the past week, what have you fed your baby? By this, we mean what milk? */
/* Q9 - Since birth, have you attempted to breastfeed or provide breastmilk to your baby, even if only once?*/
/* Q8 - Since birth, including any time spent in hospital, has your baby ever been given any formula?*/
/* Q10 - How old was your baby in months when you stopped breastfeeding?*/
/* Q13 - Was your baby given formula in hospital? */
/* Q14 - How old was your baby in months when they were first given formula?*/

/* Necessary variables for the 6_month survey*/

/* Q5 - In the past week, what have you fed your baby? By this, we mean what milk?*/
/* Q6 - Since birth, including any time spent in hospital, has your baby ever been given any formula?*/
/* Q7 - Since the last time we contacted you, which was when your baby was about 2 months old, have you tried to breastfeed or provide breastmilk to your baby, even if only once?*/
/* Q8 - How old was your baby in months when you stopped breastfeeding?*/
/* Q10 - How old was your baby in months when they were first given formula?*/
/* Q20 - Since birth, has your baby ever been given liquids other than breastmilk or formula, such as water, sugar water or juice? Other liquids do not include vitamins or medications.*/
/* Q22 - How old was your baby in months the first time they were given liquids other than breastmilk or formula?*/
/* Q23 - Since birth, has your baby ever been given any solid food such as meat, chicken, cereal, vegetables, or fruit?*/
/* Q24 - How old was your baby, in months, the first time they were given any solid food, such as meat, chicken, cereal, vegetables, or fruit?*/

/* Necessary variables for the 12_month survey*/

/* Q5 - In the past week, have you provided breastmilk to your baby?*/
/* Q6 - How old was your baby in months when you stopped providing breastmilk?*/

```
/*NOTE: Only those respondents with valid answers (i.e., without missing, don't know, refused
responses) on the questions above will be included in calculations.*/
/*********************************************************************************************/
/*********************************************************************************************/


DEFINE !IMPORT_DATA(FileName= !TOKEN(1) /  SheetName= !TOKEN(1) / Month =
!TOKEN(1))
    GET DATA /TYPE=XLSX
     /FILE= !FileName
     /SHEET=name !SheetName
     /CELLRANGE=full
     /READNAMES=on
     /ASSUMEDSTRWIDTH=32767.
    EXECUTE.
    DATASET NAME !CONCAT("data_",!Month, "mth").


    /***********************************************************************************************
*******************/
    /*The following three sections converts all the RELATED character variables into numeric
responses        */
    /*of the corresponding dataset, excludes cases where the family is living outside of the
PHU or              */
    /*the baby is not living with the mom or if  (Q7 from 2mth | Q5 from 6mth | Q5 from 12mth)
is missing. It also drops  */
    /* all the irrelevant variables and saves the dataset with name: data_2mth, data_6mth or
data_12mth.        */
            /* Only the lines involving Q3,Q4, Q7 etc. are to be changed to match the variable
names in the source dataset. */
    /***********************************************************************************************
*******************/

    /***************/
    /*SECTION-1*/
    /***************/
    !IF (!Month = 2) !THEN
        DATASET ACTIVATE data_2mth.


                 /*defining blank as missing values*/
                MISSING VALUES Q3 Q4 Q7 Q8 Q9 Q10 Q13 Q14 ClientID (' ').

                /*saving the last part of the answer of Q3 as new variable X2MTH_03*/
                /*For example if Q3 = IN_01_1    then X2MTH_03 = 1*/
                /*Same task is repeated for all other variables*/
                IF NOT(missing(Q3)) X2MTH_03=NUMBER(CHAR.SUBSTR(Q3,7),F1.0).
                IF NOT(missing(Q4)) X2MTH_04=NUMBER(CHAR.SUBSTR(Q4,7),F1.0).
                IF NOT(missing(Q7))X2MTH_07=NUMBER(CHAR.SUBSTR(Q7,4),F1.0).
                IF NOT(missing(Q8))X2MTH_08=NUMBER(CHAR.SUBSTR(Q8,4),F1.0).
                IF NOT(missing(Q9)) X2MTH_09=NUMBER(CHAR.SUBSTR(Q9,4),F1.0).
                IF NOT(missing(Q10)) X2MTH_10=NUMBER(CHAR.SUBSTR(Q10,5),F1.0).
                IF NOT(missing(Q13)) X2MTH_13=NUMBER(CHAR.SUBSTR(Q13,4),F1.0).
                IF NOT(missing(Q14)) X2MTH_14=NUMBER(CHAR.SUBSTR(Q14,5),F1.0).
                IF NOT(missing(ClientID))
CLIENTID_N=NUMBER(CHAR.SUBSTR(ClientID,1),F15).
                EXECUTE.

                COMPUTE exclude_2=1-((X2MTH_03   = 1 | MISSING(X2MTH_03) ) &
(X2MTH_04 = 1  | MISSING(X2MTH_04)) & NOT MISSING(X2MTH_07)).
        SELECT IF exclude_2=0.
        SORT CASES BY CLIENTID_N.
        EXECUTE.
```

```
        MATCH FILES
        FILE = * /
        KEEP = CLIENTID_N X2MTH_03 X2MTH_04 X2MTH_07 X2MTH_08 X2MTH_09
X2MTH_10 X2MTH_13 X2MTH_14 exclude_2.
        EXECUTE.
        DATASET NAME data_2mth.
    !IFEND.




    /***************/
    /*SECTION-2*/
    /***************/
    !IF (!Month = 6) !THEN
        DATASET ACTIVATE data_6mth.

            /*defining blank as missing values*/
            MISSING VALUES Q3 Q4 Q5 Q6 Q7 Q8 Q10 Q20 Q22 Q23 Q24 ClientID (' ').


/*Look at section-1 above for explanation.*/
        IF NOT(missing(Q3)) X6MTH_03=NUMBER(CHAR.SUBSTR(Q3,7),F2.0).
        IF NOT(missing(Q4)) X6MTH_04=NUMBER(CHAR.SUBSTR(Q4,7),F2.0).
        IF NOT(missing(Q5)) X6MTH_05=NUMBER(CHAR.SUBSTR(Q5,4),F2.0).
        IF NOT(missing(Q6)) X6MTH_06=NUMBER(CHAR.SUBSTR(Q6,4),F2.0).

        IF NOT(missing(Q7)) X6MTH_07=NUMBER(CHAR.SUBSTR(Q7,8),F2.0).
        IF NOT(missing(Q8)) X6MTH_08=NUMBER(CHAR.SUBSTR(Q8,8),F2.0).
        IF NOT(missing(Q10)) X6MTH_10=NUMBER(CHAR.SUBSTR(Q10,10),F2.0).

        IF NOT(missing(Q20)) X6MTH_20=NUMBER(CHAR.SUBSTR(Q20,4),F2.0).
        IF NOT(missing(Q22)) X6MTH_22=NUMBER(CHAR.SUBSTR(Q22,10),F2.0).
        IF NOT(missing(Q23)) X6MTH_23=NUMBER(CHAR.SUBSTR(Q23,4),F2.0).
        IF NOT(missing(Q24)) X6MTH_24=NUMBER(CHAR.SUBSTR(Q24,4),F2.0).
        IF NOT(missing(ClientID)) CLIENTID_N=NUMBER(CHAR.SUBSTR(ClientID,1),F15).

            EXECUTE.
        COMPUTE exclude_6=1-((X6MTH_03   = 1 | MISSING(X6MTH_03) )  & (X6MTH_04
= 1  | MISSING(X6MTH_04)) & NOT MISSING(X6MTH_05)).
        SELECT IF exclude_6=0.
        SORT CASES BY CLIENTID_N.
        EXECUTE.

        MATCH FILES
        FILE = * /
        KEEP = CLIENTID_N X6MTH_03 X6MTH_04 X6MTH_05 X6MTH_06 X6MTH_07
X6MTH_08 X6MTH_10 X6MTH_20 X6MTH_22 X6MTH_23 X6MTH_24 exclude_6.
        DATASET NAME data_6mth.
        EXECUTE.
    !IFEND.


    /***************/
    /*SECTION-3*/
    /***************/
    !IF (!Month = 12) !THEN
        DATASET ACTIVATE data_12mth.

 /*defining blank as missing values*/
        MISSING VALUES Q3 Q4 Q5 Q6 ClientID (' ').


/*Look at section-1 above for explanation.*/
```

```
    IF NOT(missing(Q3)) X12MTH_03=NUMBER(CHAR.SUBSTR(Q3,7),F2.0).
      IF NOT(missing(Q4)) X12MTH_04=NUMBER(CHAR.SUBSTR(Q4,7),F2.0).
      IF NOT(missing(Q5)) X12MTH_05=NUMBER(CHAR.SUBSTR(Q5,10),F2.0).
      IF NOT(missing(Q6)) X12MTH_06=NUMBER(CHAR.SUBSTR(Q6,10),F2.0).
      IF NOT(missing(ClientID))
CLIENTID_N=NUMBER(CHAR.SUBSTR(ClientID,1),F15.0).
            EXECUTE.
      COMPUTE exclude_12=1-((X12MTH_03   = 1 | MISSING(X12MTH_03) )  &
(X12MTH_04 = 1  | MISSING(X12MTH_04)) & NOT MISSING(X12MTH_05)).
      SELECT IF exclude_12=0.
      SORT CASES BY CLIENTID_N.
      EXECUTE.


      MATCH FILES
      FILE = * /
      KEEP = CLIENTID_N X12MTH_03 X12MTH_04 X12MTH_05 X12MTH_06
exclude_12.
      DATASET NAME data_12mth.
      EXECUTE.
   !IFEND.

!ENDDEFINE.
```

File 3

```
* Encoding: UTF-8.
/*############################################################*/
/* Last modified: March 25, 2018                            */
/*                                                    */
/* All the macros in this file take time as an argument            */
/*                                                    */
/* cross sectional calculation is the default              */
/*                                                    */
/* Cross sectional macros: anybf_2, exclusivebf_2, anybf_6              */
/*       exclusivebf_6 and anybf_12                 */
/* These macros by default uses cross sectional datasets            */
/*                                                    */
/* Macros for longitudinal calculations:              */
/*          anybf_long, exclusivebf_long                  */
/*                                                    */
/* longitudinal macros call cross-sectional macros to do the              */
/* calculations using the merged dataset.               */
/*############################################################*/


/*****************************************************************************
**/
/*Macro to create a new variable named anybf using 2mth variables        */
/*data=data_2mth is the default.                  */
/*type: is used to specify whether it will be used for cross sectional(1) or longitudinal(2)   */
/*debug: used to check the output dataset. 1 to keep the dataset, 0 to remove the dataset    */
/*Refer to Figure 1 in Any Breastfeeding Core Indicator document */
/*****************************************************************************
*/

DEFINE !anybf_2 (time = !TOKEN(1) / data= !DEFAULT(data_2mth) !TOKENS(1) / type=
!DEFAULT (1) !TOKENS(1) / debug= !DEFAULT (0) !TOKENS(1))
  !LET !dcopy=!CONCAT(!data,"_copy") .
  DATASET ACTIVATE !data.
```

```
/***********/
/*If cross-sectional, dataset is copied and the calculation is done on the copied version */
/*NO_MEANING_2 is created to select the rows to be used for calculation*/
/*If cross sectional (type=1) then all the rows are used*/
/*If longitudinal(type=2) NO_MEANING_2 will be defined in the long macros and the
following*/
/*section won't run at that point.*/
/***********/
!IF (!type=1) !then
    DATASET COPY !dcopy.
    DATASET ACTIVATE !dcopy.
    COMPUTE NO_MEANING_2 = 1.
 !IFEND.


  /***********/
  /*a time variable is created in the dataset, then recoded into categories for Q10 question
saved as t2*/
  /***********/
    COMPUTE time=!time.
    RECODE time (LO thru 0.4999=1) (LO thru 0.9999=2) (LO thru 1.4999=3) (LO thru
1.9999=4) (LO thru 2.4999=5) (LO thru 2.9999=6)  INTO t2.
    EXECUTE.


    DO IF NO_MEANING_2=1.
      DO IF X2MTH_07 = 1 | X2MTH_07 = 3. /*BF or combination in last 7 days */
      COMPUTE  anybf=1.
      ELSE IF X2MTH_07 = 2 & X2MTH_09 = 1 & RANGE(X2MTH_10, t2, 6) . /*Formula in
last 7 days but stopped bf after time*/
      COMPUTE anybf =1.
      ELSE IF X2MTH_07 = 2 & X2MTH_09 = 1 & (0<X2MTH_10 & X2MTH_10< t2) .
/*Formula in last 7 days but stopped bf before time*/
      COMPUTE anybf=0.
      ELSE IF X2MTH_07 = 2 & X2MTH_09 = 0. /*Formula in last 7 days and never attempted
to bf*/
      COMPUTE anybf=0.
      ELSE.
      COMPUTE anybf=$SYSMIS.
      END IF.
    END IF.

  /***********/
  /*If cross sectional (type=1) then mean of the anybf variable is calculated*/
  /***********/
  !IF (!type=1) !THEN
  title !quote(!concat( "Proportion of ANY breast feeding at time=",!time,"months")).
  DATASET ACTIVATE !dcopy.
  DESCRIPTIVES VARIABLES=anybf /STATISTICS=MEAN.
  title.
  subtitle.
  !IFEND.

    /***********/
    /*If debug=0 and typ=1 the copied version of the table is closed*/
    /***********/
    !IF (!debug=0 & !type=1) !THEN
    DATASET ACTIVATE !data.
    DATASET CLOSE !dcopy.
    !IFEND.

!ENDDEFINE.
/*END OF anybf_2 macro*/
/*######################################################*/
```

```
/*********************************************************************************************/
/*Macro to create a new variable named exclusivebf using 2mth variables           */
/*If cross-sectional, mean of the new variable is calculated                 */
/*If longitudinal the file is sent back to orginal macro without calculating the mean    */
/*debug: to check the output dataset. 1 to keep the dataset, 0 to remove the dataset      */
/*Refer to Figures 1-3 in Exclusive Breastfeeding Core Indicator document */
/*********************************************************************************************/

DEFINE !exclusivebf_2 (time = !TOKEN(1) / data= !DEFAULT(data_2mth) !TOKENS(1)/ type=
!DEFAULT (1) !TOKENS(1) / debug= !DEFAULT (0) !TOKENS(1))

  !LET !dcopy=!CONCAT(!data,"_copy") .
  DATASET ACTIVATE !data.

  /************/
  /*If cross-sectional, dataset is copied and the calculation is done on the copied version */
  /*NO_MEANING_2 is created to select the rows to be used for calculation*/
  /*If cross sectional (type=1) then all the rows are used*/
  /*If longitudinal(type=2) NO_MEANING_2 will be defined in the long macros and the
following*/
  /*section won't run at that point.*/
  /************/
  !IF (!type=1) !then
     DATASET COPY !dcopy.
     DATASET ACTIVATE !dcopy.
     COMPUTE NO_MEANING_2 = 1.
  !IFEND.


    /****************/
    /*a time variable is created in the dataset, then recoded into categories for Q10 and Q14
question saved as t2*/
    /****************/
    COMPUTE time=!time.
    RECODE time (LO thru 0.4999=1) (LO thru 0.9999=2) (LO thru 1.4999=3) (LO thru
1.9999=4) (LO thru 2.4999=5) (LO thru 2.9999=6) INTO t2.
    EXECUTE.


    DO IF NO_MEANING_2=1.

       /*********************/
       /*Baby had breast milk*/
       /*********************/

         DO IF X2MTH_07 = 1 & X2MTH_08 = 0.
           COMPUTE  exclusivebf=1.
         ELSE IF X2MTH_07 = 1 & X2MTH_08 = 1 & X2MTH_13 = 0  & RANGE(X2MTH_14,
t2, 6) .
             COMPUTE exclusivebf =1.
         ELSE IF X2MTH_07 = 1 & X2MTH_08 = 1 & X2MTH_13 = 0 & (0<X2MTH_14 &
X2MTH_14< t2) .
             COMPUTE exclusivebf=0.
     ELSE IF X2MTH_07 = 1 & X2MTH_08 = 1 & X2MTH_13 = 1 .
             COMPUTE exclusivebf=0.

       /******************/
       /*Baby had formula */
       /******************/

         ELSE IF X2MTH_07 = 2 & X2MTH_09 = 1 & RANGE(X2MTH_10, t2, 6) & X2MTH_13
= 0 & RANGE(X2MTH_14, t2, 6) .
             COMPUTE exclusivebf =1.
         ELSE IF X2MTH_07 = 2 & X2MTH_09 = 1 & (0<X2MTH_10 & X2MTH_10< t2 ).
```

```
           COMPUTE exclusivebf =0.
         ELSE IF X2MTH_07 = 2 & X2MTH_09 = 0 .
           COMPUTE exclusivebf =0.
         ELSE IF X2MTH_07 = 2 & X2MTH_09 = 1 & RANGE(X2MTH_10, t2, 6) & X2MTH_13
= 0 & (0<X2MTH_14 & X2MTH_14< t2) .
           COMPUTE exclusivebf =0.
    ELSE IF X2MTH_07 = 2 & X2MTH_09 = 1 & RANGE(X2MTH_10, t2, 6) & X2MTH_13 = 1.
           COMPUTE exclusivebf =0.

                  /********************/
        /*Baby had combination*/
        /********************/

         ELSE IF X2MTH_07 = 3 & X2MTH_13 = 0 & RANGE(X2MTH_14, t2, 6).
           COMPUTE exclusivebf=1.
         ELSE IF X2MTH_07 = 3 & X2MTH_13 = 0 & (0<X2MTH_14 & X2MTH_14< t2).
           COMPUTE exclusivebf=0.
    ELSE IF X2MTH_07 = 3 & X2MTH_13 = 1 .
           COMPUTE exclusivebf=0.
         ELSE.
           COMPUTE exclusivebf =$SYSMIS.
         END IF.
    END IF.

  /***********/
  /*If cross sectional (type=1) then mean of the exclusivebf variable is calculated*/
  /***********/
  !IF (!type=1) !THEN
  title !quote(!concat( "Proportion of EXCLUSIVE breast feeding at time=",!time,"months")).
  DATASET ACTIVATE !dcopy.
  DESCRIPTIVES VARIABLES=exclusivebf
  /STATISTICS=MEAN.
  !IFEND.

  /***********/
  /*If debug=0 and typ=1 the copied version of the table is closed*/
  /***********/
  !IF (!debug=0 & !type=1) !THEN
  DATASET ACTIVATE !data.
  DATASET CLOSE !dcopy.
  !IFEND.

!ENDDEFINE.
/*END OF exclusivebf_2 macro*/
/*###################################################*/


/*****************************************************************************************
*/
/*Macro to create a new variable named anybf(anybreastfeeding) using 6mth variables
*/
/*If cross-sectional(type=1), mean of the new variable is calculated
*/
/*If longitudinal(type=2) the file is sent back to original macro without calculating the mean   */
/*debug: to check the output dataset. 1 to keep the dataset, 0 to remove the dataset        */
/*Refer to Figure 2 in Any Breastfeeding Core Indicator document */
/*****************************************************************************************
*/

DEFINE !anybf_6 (time = !TOKEN(1) / data= !DEFAULT(data_6mth) !TOKENS(1) / type=
!DEFAULT (1) !TOKENS(1) / debug= !DEFAULT (0) !TOKENS(1))

   !LET !dcopy=!CONCAT(!data,"_copy") .
   DATASET ACTIVATE !data.
```

```
/***********/
/*If cross-sectional, dataset is copied and the calculation is done on the copied version */
/*NO_MEANING_6 is created to select the rows to be used for calculation*/
/*If cross sectional (type=1) then all the rows are used*/
/*If longitudinal(type=2) NO_MEANING_6 will be defined in the long macros and the
following*/
/*section won't run at that point.*/
/***********/
!IF (!type=1) !then
  DATASET COPY !dcopy.
  DATASET ACTIVATE !dcopy.
  COMPUTE NO_MEANING_6 = 1.
!IFEND.


/***********/
/*a time variable is created in the dataset, then recoded into categories for Q8 question
saved as tb6*/
/***********/
COMPUTE time=!time.
RECODE time (LO thru 1.9999=0) (LO thru 2.4999=1) (LO thru 2.9999=2) (LO thru
3.4999=3) (LO thru 3.9999=4) (LO thru 4.4999=5)
                (LO thru 4.9999=6) (LO thru 5.4999=7) (LO thru 5.9999=8) (LO thru
6.4999=9) (LO thru 6.9999=10) INTO tb6.
EXECUTE.

DO IF NO_MEANING_6=1.
    DO IF X6MTH_05 = 1 | X6MTH_05 = 3.
       COMPUTE  anybf=1.
    ELSE IF X6MTH_05 = 2 & X6MTH_07 = 1 & RANGE(X6MTH_08, tb6, 10) .
       COMPUTE anybf =1.
    ELSE IF X6MTH_05 = 2 & X6MTH_07 = 1 & (0<X6MTH_08 & X6MTH_08< tb6) .
       COMPUTE anybf=0.
    ELSE IF X6MTH_05 = 2 & X6MTH_07 = 0.
       COMPUTE anybf=0.
    ELSE.
       COMPUTE anybf=$SYSMIS.
    END IF.
END IF.


/***********/
/*If cross sectional (type=1) then mean of the anybf variable is calculated*/
/***********/
!IF (!type=1) !THEN
title !quote(!concat( "Proportion of ANY breast feeding at time=",!time,"months")).
DATASET ACTIVATE !dcopy.
DESCRIPTIVES VARIABLES=anybf
 /STATISTICS=MEAN.
!IFEND.


/***********/
/*If debug=0 and typ=1 the copied version of the table is closed*/
/***********/
!IF (!debug=0 & !type=1) !THEN
DATASET ACTIVATE !data.
DATASET CLOSE !dcopy.
!IFEND.

!ENDDEFINE.
/*END OF anybf_6 macro*/
/*####################################################*/
```

```
/******************************************************************************************/
/*Macro to check the beginning time of solid or liquid (other than breast milk)         */
/*This macro will be called from the exclusivebf_6 macro.                */
/*flt stands for filter. SL1, SL2, SL3, and SL4    are the four filters to select the rows  */
/*            to be used to run this macro on.                            */
/*debug: to check the output dataset. 1 to keep the dataset, 0 to remove the dataset        */
/******************************************************************************************/

DEFINE !solidliquid_6 (time = !TOKEN(1) / data= !TOKEN(1) / flt=!TOKEN(1))

    DATASET ACTIVATE !data .

    DO IF !flt=1.
        DO IF X6MTH_20 = 0 & X6MTH_23 = 0. /*no liquid, no solid*/
            COMPUTE  exclusivebf=1.
        ELSE IF X6MTH_20 = 0 & X6MTH_23 = 1 & RANGE(X6MTH_24, tf6, 14) . /*no liquid,
solid introduced after time*/
            COMPUTE exclusivebf =1.

        ELSE IF X6MTH_20 = 1 & RANGE(X6MTH_22, tf6, 14) & X6MTH_23 = 0. /*no solid,
liquid introduced after time*/
            COMPUTE exclusivebf=1.
        ELSE IF X6MTH_20 = 1 & RANGE(X6MTH_22, tf6, 14) & X6MTH_23 = 1 &
RANGE(X6MTH_24, tf6, 14) . /*both solid & liquid introduced after time */
            COMPUTE exclusivebf=1.

        ELSE IF X6MTH_20 = 0  & X6MTH_23 = 1 & (0<X6MTH_24 & X6MTH_24<tf6). /*no
liquid, solid introduced before time*/
            COMPUTE exclusivebf=0.
        ELSE IF X6MTH_20 = 1  &  (0<X6MTH_22 & X6MTH_22<tf6) . /*liquid introduced
before time*/
            COMPUTE exclusivebf =0.
        ELSE IF X6MTH_20 = 1 & RANGE(X6MTH_22, tf6, 14) & X6MTH_23 = 1 &
(0<X6MTH_24 & X6MTH_24<tf6) . /*both solid liquid introduced before time*/
            COMPUTE exclusivebf =0.
        ELSE.
            COMPUTE exclusivebf=$SYSMIS.
        END IF.
    END IF.

    EXECUTE.

!ENDDEFINE.

/*END OF solidliquid_6 macro*/
/*#####################################################*/




/*******************************************************************************************
***/
/*Macro to create a new variable named exclusivebf for the 6mth dataset or merged dataset
*/
/*If cross-sectional, mean of the new variable is calculated                */
/*If longitudinal the file is sent back to orginial macro without calculating the mean
*/
/*debug: to check the output dataset. 1 to keep the dataset, 0 to remove the dataset
*/
/*Refer to Figures 4-6 in Exclusive Breastfeeding Core Indicator document */
/*******************************************************************************************
***/

DEFINE !exclusivebf_6 (time = !TOKEN(1) / data= !DEFAULT(data_6mth) !TOKENS(1) / type=
!DEFAULT (1) !TOKENS(1) / debug= !DEFAULT (0) !TOKENS(1))
```

```
!LET !dcopy=!CONCAT(!data,"_copy") .
!LET !data2 = !data.
DATASET ACTIVATE !data.

/*If cross-sectional, dataset is copied and the calculation is done on the copied version */
/*NO_MEANING_6 is created to select the rows to be used for calculation*/
/*If cross sectional (type=1) then all the rows are used*/
/*If longitudinal(type=2) NO_MEANING_6 will be defined in the long macros and the
following*/
/*section won't run at that point.*/
!IF (!type=1) !then
   !LET !data2= !dcopy.
   DATASET COPY !dcopy.
   DATASET ACTIVATE !data2.
   COMPUTE NO_MEANING_6 = 1.
!IFEND.


/************/
/*a time variable is created in the dataset, then recoded into categories for Q8 question
saved as tb6*/
/************/
COMPUTE time=!time.
RECODE time (LO thru 1.9999=0) (LO thru 2.4999=1) (LO thru 2.9999=2) (LO thru
3.4999=3) (LO thru 3.9999=4) (LO thru 4.4999=5)
               (LO thru 4.9999=6) (LO thru 5.4999=7) (LO thru 5.9999=8) (LO thru
6.4999=9) (LO thru 6.9999=10)  INTO tb6.


/************/
/*a time variable is created in the dataset, then recoded into categories for Q10 question
saved as tf6*/
/************/
RECODE time   (LO thru 0.4999=1) (LO thru 0.9999=2) (LO thru 1.4999=3)
               (LO thru 1.9999=4) (LO thru 2.4999=5) (LO thru 2.9999=6) (LO thru
3.4999=7) (LO thru 3.9999=8) (LO thru 4.4999=9)
               (LO thru 4.9999=10) (LO thru 5.4999=11) (LO thru 5.9999=12) (LO thru
6.4999=13) (LO thru 6.9999=14)  INTO tf6.
EXECUTE.

DO IF NO_MEANING_6=1.
    DO IF X6MTH_05   = 1 & X6MTH_06 = 1 & (0<X6MTH_10 & X6MTH_10 < tf6).
       COMPUTE exclusivebf=0.
    ELSE IF X6MTH_05 = 2 & X6MTH_07 = 1 & (0<X6MTH_08 & X6MTH_08 < tb6).
       COMPUTE exclusivebf=0.
    ELSE IF X6MTH_05 = 2 & X6MTH_07 = 0.
        COMPUTE exclusivebf=0.
    ELSE IF X6MTH_05 = 2 & X6MTH_07 = 1 &  RANGE(X6MTH_08, tb6, 10) &
(0<X6MTH_10 &  X6MTH_10 < tf6).
        COMPUTE exclusivebf=0.
    ELSE IF X6MTH_05 = 3 &  (0<X6MTH_10 & X6MTH_10 < tf6).
        COMPUTE exclusivebf=0.
    ELSE.
        COMPUTE exclusivebf =$SYSMIS.
    END IF.
END IF.

/************/
/*SL1, SL2, SL3, SL4 are indicator variables created to select rows for which solidliquid_6
macro will be called*/
/************/
COMPUTE SL1=(X6MTH_05   = 1 & X6MTH_06 = 0 & NO_MEANING_6=1).
COMPUTE SL2=(X6MTH_05   = 1 & X6MTH_06 = 1 & RANGE(X6MTH_10, tf6, 14) &
NO_MEANING_6=1).
```

```
   COMPUTE SL3=(X6MTH_05 = 2 & X6MTH_07 = 1 &  RANGE(X6MTH_08, tb6, 10) &
RANGE(X6MTH_10, tf6, 14) & NO_MEANING_6=1).
   COMPUTE SL4=(X6MTH_05 = 3 & RANGE(X6MTH_10, tf6, 14) & NO_MEANING_6=1).

  /************/
  /* The solidliquid_6 macro is called 4 times. Each time set of calculations will be done*/
  /* to compute exclusivebf variable but only for the rows where SL1=1 or SL2=1 etc...    */
  /************/
  !solidliquid_6 time=!time  data = !data2 flt=SL1.
  !solidliquid_6 time=!time  data = !data2 flt=SL2.
  !solidliquid_6 time=!time  data = !data2 flt=SL3.
  !solidliquid_6 time=!time  data = !data2 flt=SL4.

    /************/
    /*If cross sectional (type=1) then mean of the anybf variable is calculated*/
    /************/
    !IF (!type=1) !THEN
    title !quote(!concat( "Proportion of EXCLUSIVE breast feeding at time=",!time,"months")).
    DATASET ACTIVATE !data2.
    DESCRIPTIVES VARIABLES=exclusivebf
      /STATISTICS=MEAN.
    !IFEND.

    /************/
    /*If debug=0 and typ=1 the copied version of the table is closed*/
    /************/
    !IF (!debug=0 & !type=1) !THEN
    DATASET ACTIVATE !data.
    DATASET CLOSE !dcopy.
    !IFEND.

!ENDDEFINE.

/*END OF exclusivebf_6 macro*/
/*####################################################*/




/********************************************************************************************
****/
/*Macro to create a new variable named anybf for the 12mth dataset or merged dataset      */
/*If cross-sectional(type=1), mean of the new variable is calculated               */
/*If longitudinal(type=2) the file is sent back to orginal macro without calculating the mean
*/
/*debug: to check the output dataset. 1 to keep the dataset, 0 to remove the dataset
*/
/*Refer to Figure 3 in Any Breastfeeding Core Indicator document */
/********************************************************************************************
****/


DEFINE !anybf_12 (time = !TOKEN(1) / data= !DEFAULT(data_12mth) !TOKENS(1) / type=
!DEFAULT (1) !TOKENS(1) / debug= !DEFAULT (0) !TOKENS(1))

   !LET !dcopy=!CONCAT(!data,"_copy") .
   DATASET ACTIVATE !data.

   !IF (!type=1) !then
            DATASET COPY !dcopy.
            DATASET ACTIVATE !dcopy.
   !IFEND.

   COMPUTE time=!time.
```

```
    RECODE time (LO thru 5.9999=0) (LO thru 6.4999=1) (LO thru 6.9999=2) (LO thru
7.4999=3) (LO thru 7.9999=4) (LO thru 8.4999=5)
                (LO thru 8.9999=6) (LO thru 9.4999=7) (LO thru 9.9999=8) (LO thru 10.4999=9)
(LO thru 10.9999=10)
                (LO thru 11.4999=11) (LO thru 11.9999=12) (LO thru 12.4999=13) (LO thru
12.9999=14)    INTO t12.

    DO IF X12MTH_05 = 1.
        COMPUTE  anybf=1.
    ELSE IF X12MTH_05 = 0 &  RANGE(X12MTH_06, t12, 14) .
        COMPUTE anybf =1.
    ELSE IF X12MTH_05 = 0 &  (0<X12MTH_06 & X12MTH_06 < t12) .
        COMPUTE anybf=0.
    ELSE.
        COMPUTE anybf=$SYSMIS.
    END IF.

    /************/
    /*If cross sectional (type=1) then mean of the anybf variable is calculated*/
    /************/
    !IF (!type=1) !THEN
      title !quote(!concat( "Proportion of ANY breast feeding at time=",!time,"months")).
      DATASET ACTIVATE !dcopy.
      DESCRIPTIVES VARIABLES=anybf /STATISTICS=MEAN.
    !IFEND.

    /************/
    /*If debug=0 and type=1 the copied version of the table is closed*/
    /************/
    !IF (!debug=0 & !type=1) !THEN
        DATASET ACTIVATE !data.
        DATASET CLOSE !dcopy.
    !IFEND.

!ENDDEFINE.
/*END OF anybf_12 macro*/
/*####################################################*/




/*#####################################################*/
/*****************************************************************************/
/* The three datasets are merged and named as data_12_6_2mth    */
/* This is not a macro. These following 7 lines will run as              */
/* regular code when this file will be called using the                  */
/* insert command in the Result_viewer.sps file            */
/*****************************************************************************/

MATCH FILES /FILE='data_12mth' /IN=IN_12MTH
    /FILE='data_6mth' /IN= IN_6MTH
    /FILE='data_2mth' /IN=IN_2MTH
    /by CLIENTID_N.
SELECT IF IN_2MTH AND IN_6MTH AND IN_12MTH.
DATASET NAME data_12_6_2mth.
EXECUTE.
/*#####################################################*/
```

```
/*****************************************************************************************************
*******************/
/*Macro to calculate anybf based on participants who filled out all three surveys
*/
/*This macro calls the cross sectional macros based on the argument: time
*/
/*                                                  */
/*If time >=7 only the anybf_12 is called.                          */
/*
*/
/*If 3<=time<7 , 1)anybf_12 is called first (which returns the dataset with anybf calculated)
*/
/*          2)anybbf_6 is called using the dataset returned by anybf_12          */
/*          to compute anybf only for rows where anybf is missing.       */
/*                              */
/*If time<3, 1) anybf_12 is called first (which returns the dataset with anybf calculated)
*/
/*          2) anybbf_6 is called using the dataset returned by anybf_12          */
/*            to compute anybf only for rows where anybf is still missing.      */
/*          3) anybbf_2 is called using the dataset returned by anybf_6            */
/*            to compute anybf only for rows where anybf is still missing.       */
/*                              */
/*debug: to check the output dataset. 1 to keep the dataset, 0 to remove the dataset
*/
/*****************************************************************************************************
*******************/

DEFINE !anybf_long (time = !TOKEN(1) / data= !DEFAULT(data_12_6_2mth) !TOKEN(1)/
debug= !DEFAULT (0) !TOKENS(1))

    !LET !dcopy=!CONCAT(!data,"_copy") .

    /************/
    /*Makes a copy of the data_12_6_2mth and creates a variable COND which equals to the
argument: time*/
    /************/
    DATASET ACTIVATE !data .
    DATASET COPY !dcopy.
    DATASET ACTIVATE !dcopy.
    COMPUTE COND= !time .
    EXE.

    !anybf_12 time=!time data=!dcopy type=2.
    EXECUTE.

    DATASET ACTIVATE !dcopy.
    DO IF MISSING(anybf) & COND<7.
       COMPUTE NO_MEANING_6 = 1 .
    ELSE.
       COMPUTE NO_MEANING_6 = 0 .
    END IF.
    EXECUTE.

    !anybf_6 time=!time data=!dcopy type=2.
    EXECUTE.

    DATASET ACTIVATE !dcopy.
    DO IF MISSING(anybf) & COND <3.
       COMPUTE NO_MEANING_2 = 1 .
    ELSE.
       COMPUTE NO_MEANING_2 = 0 .
    END IF.
    EXECUTE.
```

```
  !anybf_2 time=!time data=!dcopy type=2.
  EXECUTE.


  /***********/
  /*If cross sectional (type=1) then mean of the anybf variable is calculated*/
  /***********/
  title !quote(!concat( "Proportion of ANY breast feeding (long) at time=",!time,"months")).
  DATASET ACTIVATE !dcopy.
  DESCRIPTIVES VARIABLES=anybf  /STATISTICS=MEAN.
  EXECUTE.

  /***********/
  /*If debug=0 and typ=1 the copied version of the table is closed*/
  /***********/
  !IF (!debug=0) !THEN
  DATASET ACTIVATE !data.
  DATASET CLOSE !dcopy.
  !IFEND.

!ENDDEFINE.
/*END OF anybf_long macro*/
/*####################################################*/



/*******************************************************************************
******************************/
/*Macro to calculate exclusivebf based on participant who filled out all three surveys
*/
/*This macro calls the cross sectional macros based on the argument: time
          */
/*                                            */
/*If 3<=time<7 , exclusivebf_6 macro is called
*/
/*
*/
/*If time<3, 1) exclusivebf_6 is called first (which returns the dataset with exclusivebf
calculated)                    */
/*        2) exclusivebf_2 is called using the dataset returned by exclusivebf_6        */
/*             to compute exclusivebf only for rows where exclusivebf is still missing.
*/
/*                                    */
/*debug: to check the output dataset. 1 to keep the dataset, 0 to remove the dataset
*/
/*******************************************************************************
******************************/

DEFINE !exclusivebf_long (time = !TOKEN(1) / data= !DEFAULT(data_12_6_2mth)
!TOKEN(1)/ debug= !DEFAULT (0) !TOKENS(1))

  !LET !dcopy=!CONCAT(!data,"_copy") .

  /*Makes a copy of the data_12_6_2mth and creates a variable COND which equals to the
argument: time*/
  DATASET ACTIVATE !data .
  DATASET COPY !dcopy.
  DATASET ACTIVATE !dcopy.
  COMPUTE COND= !time .
  EXE.

  DO IF COND<7.
     COMPUTE NO_MEANING_6 = 1.
  ELSE.
```

```
       COMPUTE NO_MEANING_6 = 0 .
       COMPUTE exclusivebf= $SYSMIS.
    END IF.
    EXECUTE.

    !exclusivebf_6 time=!time data=!dcopy type=2.
    EXECUTE.


    DATASET ACTIVATE !dcopy.
    DO IF MISSING(exclusivebf) & COND <3.
       COMPUTE NO_MEANING_2 = 1 .
    ELSE.
       COMPUTE NO_MEANING_2 = 0 .
    END IF.
    EXECUTE.

    !exclusivebf_2 time=!time data=!dcopy type=2.
    EXECUTE.

    /************/
    /*If cross sectional (type=1) then mean of the anybf variable is calculated*/
    /************/
    title !quote(!concat( "Prop. of EXCLUSIVE breast feeding (long) at time=",!time,"months")).
    DATASET ACTIVATE !dcopy.
    DESCRIPTIVES VARIABLES=exclusivebf  /STATISTICS=MEAN.
    EXECUTE.

    /************/
    /*If debug=0 and typ=1 the copied version of the table is closed*/
    /************/
    !IF (!debug=0) !THEN
    DATASET ACTIVATE !data.
    DATASET CLOSE !dcopy.
    !IFEND.

!ENDDEFINE.
/*END OF exclusivebf_long macro*/
/*#######################################################*/
```

Appendix F – SAS Syntax to Calculate Any and Exclusive Breastfeeding Indicators

```
/*****************************************************************************
***********
Task: Calculate any and exclusive breastfeeding indicators using using
        *
2months, 6months and 12months survey data                  *
Last modified: April 3, 2018                                        *
                                                       *
Cross sectional macros: anybf_2, excluxivebf_2, anybf_6, exclusivebf_6 and
anybf_12   *
Macros for longitudinal calculations: anybf_long1, exclusivebf_long1
*
/*****************************************************************************
***********

The following SAS syntax will calculate proportion of any and exclusive
breastfeeding
at a given time (in months). The syntax is based on the variables that
are provided in the surveys datasets.

Necessary variables for the 2_month survey:

Q7 - In the past week, what have you fed your baby? By this, we mean what
milk?
Q9 - Since birth, have you attempted to breastfeed or provide breastmilk to
your baby, even if only once?
Q8 - Since birth, including any time spent in hospital, has your baby ever
been given any formula?
Q10 - How old was your baby in months when you stopped breastfeeding?
Q13 - How old was your baby in months when they were first given formula?
Q14 - How old was your baby in months when they were first given formula?

Necessary variables for the 6_month survey:

Q5 - In the past week, what have you fed your baby? By this, we mean what
milk?
Q6 - Since birth, including any time spent in hospital, has your baby ever
been given any formula?
Q7 - Since the last time we contacted you, which was when your baby was
about 2 months old, have you tried to breastfeed or provide breastmilk to
your baby, even if only once?
Q8 - How old was your baby in months when you stopped breastfeeding?
Q10 - How old was your baby in months when they were first given formula?
Q20 - Since birth, has your baby every been given liquids other than
breastmilk or formula, such as water, sugar water or juice? Other liquids do
not include vitamins or medications.
Q22 - How old was your baby in months the first time they were given liquids
other than breastmilk or formula?
Q23 - Since birth, has your baby ever been given any solid food such as
meat, chicken, cereal, vegetables, or fruit?
Q24 - How old was your baby, in months, the first time they were given any
solid food, such as meat, chicken, cereal, vegetables, or fruit?

Necessary variables for the 12_month survey:

Q5 - In the past week, have you provided breastmilk to your baby?
Q6 - How old was your baby in months when you stopped providing  breastmilk?

Please note that the intention is to exclude those with missing responses
for necessary questions. Where necessary questions do not have valid
responses, the any or exclusive breastfeeding indicators cannot be
calculated.

Please note this syntax is subject to further modification as necessary in
the future. */
```

```
libname BF 'C:\Users\Sudip\Documents\Sudip-Shared\Infant Feeding
Surveillance project\data\standard data'; *please insert the path of
datasets


/************************************************************************
***********
Task: Calculate any and exclusive breastfeeding indicators for 2_month
survey        *                                                   *

/************************************************************************
***********/


* Importing 2month .csv data in SAS;
* Call the appropriate dataset in OUT="";
* Insert the appropriate .csv dataset in DATAFILE= "" ;
PROC IMPORT OUT= bf.month2data
            DATAFILE= "C:\Users\Sudip\Documents\Sudip-Shared\Infant Feed
ing Surveillance project\data\standard
data\BFI_Online_Export_2mos_Jun2015_Dec2015_tex
t.csv"
            DBMS=CSV REPLACE;
         guessingrows=500;
      GETNAMES=YES;
      DATAROW=2;
RUN;

* Caution: If you have different variable names in the source dataset other
than, for example Q7 or Q8, please replace these variables (e.g. Q7) with
* appropriate variable names in your dataset. You have to insert new names
in the data import steps below;

* Renaming variables to distinguish between 2month and 6month variables;
data data_2;
set bf.month2data (keep=ClientID Q3 -- Q14);
X2MTH_03=input(substr(Q3,7),1.); *recoding values of the variables;
X2MTH_04=input(substr(Q4,7),1.); * If you have different variable names for
2month, please replace, for example, Q4 with appropriate variable;
X2MTH_07=input(substr(Q7,4),1.);
X2MTH_08=input(substr(Q8,4),1.);
X2MTH_09=input(substr(Q9,4),1.);
X2MTH_10=input(substr(Q10,5),1.);
X2MTH_13=input(substr(Q13,4),1.);
X2MTH_14=input(substr(Q14,5),1.);
drop Q3 -- Q14;
run;



data data_2;
set data_2;
if X2MTH_03=2 | X2MTH_04=2 then exclude2=1;
else exclude2=0;
if exclude2=0; * keeping the eligible individuals;
if X2MTH_07>.;
run;



* SAS code to calculate any breastfeeding for 2month survey which takes time
(in months) and 2 months data as arguments;
%macro anybf_2(time,inputdata,type=1);
* Type has no physical meaning; * it just facilitate our calculation in the
longitudinal (common n) case;
%if %sysevalf(&time >=3) %then "Time cannot be >=3 months";

data data2;
set &inputdata;
t2=.;
```

```
if &time >=0 & &time <0.5 then t2=1;
if &time >=0.5 & &time <1 then t2=2;
if &time >=1 & &time <1.5 then t2=3;
if &time >=1.5 & &time <2 then t2=4;
if &time >=2 & &time <2.5 then t2=5;
if &time >=2.5 & &time <3 then t2=6;


if &type=1 then No_meaning_2=1; * adding this No_meaning variable to
facilitate any breastfeeding calculating for common n;
* the variable No_meaning has no physical meaning;
if No_meaning_2=1 then do;

anybf=.;

*inserting the conditions for any breastfeeding;

if X2MTH_07 = 1 or X2MTH_07 = 3 then anybf=1;

if X2MTH_07 = 2 & X2MTH_09 = 1 & (t2 le X2MTH_10 le 6) then anybf=1;

else if X2MTH_07 = 2 & X2MTH_09 = 1 & (.< X2MTH_10 lt t2) then anybf=0;

else if X2MTH_07 = 2 & X2MTH_09 = 0 then anybf=0;
end;
run;

%if &type=1 %then %do;
proc means data=data2 mean;
title "Proportion of any breastfeeding at &time months";
var anybf;
run;
%end;

%mend anybf_2;

%anybf_2(time=2,inputdata=data_2); * calculating proportion of any
breastfeeding at 2 months;
%anybf_2(time=1.5,inputdata=data_2);
%anybf_2(time=1,inputdata=data_2);
%anybf_2(time=0.5,inputdata=data_2);


* SAS code to calculate exclusive breastfeeding for 2month survey which
takes time (in months) and 2 months data as arguments;
%macro exclusivebf_2(time,inputdata,type=1);
* Type has no physical meaning; * it just facilitate our calculation in the
longitudinal (common n) case;
%if &time >=3 %then "Time cannot be >=3 months";
data data2ex;
set &inputdata;
t2=.;
if &time >=0 & &time <0.5 then t2=1;
if &time >=0.5 & &time <1 then t2=2;
if &time >=1 & &time <1.5 then t2=3;
if &time >=1.5 & &time <2 then t2=4;
if &time >=2 & &time <2.5 then t2=5;
if &time >=2.5 & &time <3 then t2=6;

if &type=1 then No_meaning_2=1;

if No_meaning_2=1 then do;

exclusivebf=.;

*Refer to Figure 1 in the LDCP PQ Exclusive BF Core indicator document;
*pathway 1: where baby had breastmilk;
if X2MTH_07=1 & X2MTH_08=0 then exclusivebf=1;
if X2MTH_07=1 & X2MTH_08=1 & X2MTH_13=0 &(t2 le X2MTH_14 le 6) then
exclusivebf=1;
```

```
if X2MTH_07=1 & X2MTH_08=1 & X2MTH_13=0 & (.< X2MTH_14 < t2) then
exclusivebf=0;
if X2MTH_07=1 & X2MTH_08=1 & X2MTH_13=1 then exclusivebf=0;


*Refer to Figure 3 in the LDCP PQ Exclusive BF Core indicator document;
* pathway 2: where baby had formula;
if X2MTH_07=2 & X2MTH_09=1 & (t2 le X2MTH_10 le 6) & X2MTH_13=0 & (t2 le
X2MTH_14 le 6) then exclusivebf=1;
if X2MTH_07=2 & X2MTH_09=1 & (.< X2MTH_10 lt t2) then exclusivebf=0;
if X2MTH_07=2 & X2MTH_09=0 then exclusivebf=0;
if X2MTH_07=2 & X2MTH_09=1 & (t2 le X2MTH_10 le 6)& X2MTH_13=0 & (.<
X2MTH_14 lt t2) then exclusivebf=0;
if X2MTH_07=2 & X2MTH_09=1 & (t2 le X2MTH_10 le 6)& X2MTH_13=1 then
exclusivebf=0;



*Refer to Figure 3 in the LDCP PQ Exclusive BF Core indicator document;
* pathway 3: where baby had combination of breastfeeding and formula;
if X2MTH_07=3 & X2MTH_13=0 & (t2 le X2MTH_14 le 6) then exclusivebf=1;
if X2MTH_07=3 & X2MTH_13=0 & (.< X2MTH_14 lt t2) then exclusivebf=0;
if X2MTH_07=3 & X2MTH_13=1 then exclusivebf=0;



end;
run;

%if &type=1 %then %do;
proc means data=data2ex mean;
title "Proportion of exclusive breastfeeding at &time months";
var exclusivebf;
run;
%end;

%mend exclusivebf_2;

%exclusivebf_2(time=2,inputdata=data_2); * calculating proportion of any
breastfeeding at 2 months;
%exclusivebf_2(time=1.5,inputdata=data_2);
%exclusivebf_2(time=1,inputdata=data_2);
%exclusivebf_2(time=0.5,inputdata=data_2);


/****************************************************************************
***********
Task: Calculate any and exclusive breastfeeding indicators for 6_month
survey        *                                              *

/****************************************************************************
***********/


* Importing 6month .csv data in SAS;
* Call the appropriate dataset in OUT="";
* Insert the appropriate .csv dataset in DATAFILE= "" ;
PROC IMPORT OUT= bf.month6data
            DATAFILE= "C:\Users\Sudip\Documents\Sudip-Shared\Infant Feed
ing Surveillance project\data\standard
data\BFI_Online_Export_6mos_Jun2015_Dec2015_tex
t.csv"
            DBMS=CSV REPLACE;
        guessingrows=500;
     GETNAMES=YES;
     DATAROW=2;
RUN;

* Renaming variables to distinguish between 2month and 6month variables;
data data_6;
set bf.month6data (keep=ClientID Q3 -- Q24);
X6MTH_03=input(substr(Q3,7),1.); * recoding values of the variables;
```

```
X6MTH_04=input(substr(Q4,7),1.); * If you have different variable names for
6month, please replace, for example, Q4 with appropriate variable;
X6MTH_05=input(substr(Q5,4),1.);
X6MTH_06=input(substr(Q6,4),1.);
X6MTH_07=input(substr(Q7,8),1.);
X6MTH_08=input(substr(Q8,8),2.);
X6MTH_10=input(substr(Q10,10),2.);
X6MTH_20=input(substr(Q20,4),1.);
X6MTH_22=input(substr(Q22,10),2.);
X6MTH_23=input(substr(Q23,4),1.);
X6MTH_24=input(substr(Q24,4),2.);
drop Q3 -- Q24;
run;


data data_6;
set data_6;
if X6MTH_03=2 | X6MTH_04=2 then exclude6=1;
else exclude6=0;
if exclude6=0;   * keeping the eligible individuals;
if X6MTH_05>.;
run;


* SAS code to calculate any breastfeeding for 6month survey which takes time
(in months) and 6 months data as arguments;
%macro anybf_6(time,inputdata,type=1);
* Type has no physical meaning; * it just facilitates our calculation in the
longitudinal (common n) case;
%if %sysevalf(&time < 2 | &time >=7) & type=1 %then "Time cannot be <2
months or >=7 months";

data data6;
set &inputdata;
tb6=.;          * for introduction stopping time of breastfeeding;
if &time<2 then tb6=0;
if &time >=2 & &time <2.5 then tb6=1;
if &time >=2.5 & &time <3 then tb6=2;
if &time >=3 & &time <3.5 then tb6=3;
if &time >=3.5 & &time <4 then tb6=4;
if &time >=4 & &time <4.5 then tb6=5;
if &time >=4.5 & &time <5 then tb6=6;
if &time >=5 & &time <5.5 then tb6=7;
if &time >=5.5 & &time <6 then tb6=8;
if &time >=6 & &time <6.5 then tb6=9;
if &time >=6.5 & &time <7 then tb6=10;

if &type=1 then No_meaning_6=1;

if No_Meaning_6=1 then do;

anybf=.;

if X6MTH_05 =1 or X6MTH_05 =3 then anybf=1;
if X6MTH_05=2 & X6MTH_07=0 then anybf=0;

if X6MTH_05=2 & X6MTH_07 =1 & (tb6 le X6MTH_08 le 10) then anybf=1;
if X6MTH_05=2 & X6MTH_07 =1 & (.< X6MTH_08 < tb6) then anybf=0;
end;
run;


%if &type=1 %then %do;
proc means data=data6 mean;
title "Proportion of any breastfeeding at &time months";
var anybf;
run;
%end;

%mend anybf_6;
```

```sas
%anybf_6(time=2.5,inputdata=data_6); * calculating proportion of any
breastfeeding at 2.5 months;
%anybf_6(time=3,inputdata=data_6); * calculating proportion of any
breastfeeding at 3 months;
%anybf_6(time=3.5,inputdata=data_6); * calculating proportion of any
breastfeeding at 3.5 months;
%anybf_6(time=4,inputdata=data_6); * calculating proportion of any
breastfeeding at 4 months;
%anybf_6(time=4.5,inputdata=data_6); * calculating proportion of any
breastfeeding at 4.5 months;
%anybf_6(time=5,inputdata=data_6); * calculating proportion of any
breastfeeding at 5 months;
%anybf_6(time=5.5,inputdata=data_6); * calculating proportion of any
breastfeeding at 5.5 months;
%anybf_6(time=6,inputdata=data_6); * calculating proportion of any
breastfeeding at 6 months;




****solidliquid program to facilitate exclusivebf calculations for 6month
survey ********;
* categories defined for breastfeeding stopping time is not similar to
formula introduction time or solid, liquid intro time;
%macro solidliquid_6(time,idata,FLT);
* FLT is a just a filtering variable to indicate which patients are
considered for solidliquid macro;
* FLT has no physical meaning; * it just facilitates our calculation;
data &idata;
set &idata;
tf6=.;   * for introduction time to formula or solid, liquid intro;
if &time >=0 & &time <0.5 then tf6=1;
if &time >=0.5 & &time <1 then tf6=2;
if &time >=1 & &time <1.5 then tf6=3;
if &time >=1.5 & &time <2 then tf6=4;
if &time >=2 & &time <2.5 then tf6=5;
if &time >=2.5 & &time <3 then tf6=6;
if &time >=3 & &time <3.5 then tf6=7;
if &time >=3.5 & &time <4 then tf6=8;
if &time >=4 & &time <4.5 then tf6=9;
if &time >=4.5 & &time <5 then tf6=10;
if &time >=5 & &time <5.5 then tf6=11;
if &time >=5.5 & &time <6 then tf6=12;
if &time >=6 & &time <6.5 then tf6=13;
if &time >=6.5 & &time <7 then tf6=14;

if &FLT=1 then do;
if X6MTH_20=0 & X6MTH_23=0 then exclusivebf=1;
if X6MTH_20=0 & X6MTH_23=1 & (tf6 le X6MTH_24 le 14) then exclusivebf=1;

if X6MTH_20=1 & (tf6 le X6MTH_22 le 14) & X6MTH_23=0 then exclusivebf=1;
if X6MTH_20=1 & (tf6 le X6MTH_22 le 14) & X6MTH_23 =1 & (tf6 le X6MTH_24 le
14) then exclusivebf=1;

if X6MTH_20=0 & X6MTH_23 =1 & (.< X6MTH_24 < tf6) then exclusivebf=0;
if X6MTH_20=1 & (.< X6MTH_22 <tf6) then exclusivebf=0;
if X6MTH_20=1 & (tf6 le X6MTH_22 le 14) & X6MTH_23=1 & (.< X6MTH_24 <tf6)
then exclusivebf=0;
end;
run;

%mend solidliquid_6;

* SAS code to calculate exclusive breastfeeding for 6month survey which
takes time (in months) and 6 months data as arguments;
%macro exclusivebf_6(time,inputdata,type=1);
* Type has no physical meaning; * it just facilitates our calculation in the
longitudinal (common n) case;

%if %sysevalf(&time < 2 | &time >=7) & type=1 %then "Time cannot be <2
months or >=7 months";
```

```
data data6ex;
set &inputdata;

tb6=.; * time variable for breastfeeding stopping time;
if &time<2 then tb6=0;
if &time >=2 & &time <2.5 then tb6=1;
if &time >=2.5 & &time <3 then tb6=2;
if &time >=3 & &time <3.5 then tb6=3;
if &time >=3.5 & &time <4 then tb6=4;
if &time >=4 & &time <4.5 then tb6=5;
if &time >=4.5 & &time <5 then tb6=6;
if &time >=5 & &time <5.5 then tb6=7;
if &time >=5.5 & &time <6 then tb6=8;
if &time >=6 & &time <6.5 then tb6=9;
if &time >=6.5 & &time <7 then tb6=10;

tf6=.; * time variable for intro time of formula, solids and liquids;
if &time >=0 & &time <0.5 then tf6=1;
if &time >=0.5 & &time <1 then tf6=2;
if &time >=1 & &time <1.5 then tf6=3;
if &time >=1.5 & &time <2 then tf6=4;
if &time >=2 & &time <2.5 then tf6=5;
if &time >=2.5 & &time <3 then tf6=6;
if &time >=3 & &time <3.5 then tf6=7;
if &time >=3.5 & &time <4 then tf6=8;
if &time >=4 & &time <4.5 then tf6=9;
if &time >=4.5 & &time <5 then tf6=10;
if &time >=5 & &time <5.5 then tf6=11;
if &time >=5.5 & &time <6 then tf6=12;
if &time >=6 & &time <6.5 then tf6=13;
if &time >=6.5 & &time <7 then tf6=14;



exclusivebf=.;

*Refer to Figure 4 in the LDCP PQ Exclusive BF Core indicator document;
* pathway 1: where baby had breastmilk;
if X6MTH_05=1 & X6MTH_06 =0 then  SL1=1;
if X6MTH_05=1 & X6MTH_06=1 & (tf6 le X6MTH_10 le 14) then SL2 =1;
if X6MTH_05=1 & X6MTH_06=1 & (.< X6MTH_10 < tf6) then exclusivebf=0;
* SL1, SL2, SL3 and SL4 has no physical meaning;
* these just identify which patients are to be considered for solidliquid
macro;



*Refer to Figure 5 in the LDCP PQ Exclusive BF Core indicator document;
* pathway 2: where baby had formula;
if X6MTH_05=2 & X6MTH_07=1 & (tb6 le X6MTH_08 le 10) & (tf6 le X6MTH_10 le
14) then SL3=1;
if X6MTH_05=2 & X6MTH_07=1 & (.< X6MTH_08 < tb6) then exclusivebf=0;
if X6MTH_05=2 & X6MTH_07=0 then exclusivebf=0;
if X6MTH_05=2 & X6MTH_07=1 & (tb6 le X6MTH_08 le 10) & (.< X6MTH_10 < tf6)
then exclusivebf=0;



*Refer to Figure 6 in the LDCP PQ Exclusive BF Core indicator document;
* pathway 3: where baby had combination of breastfeeding and formula;
if X6MTH_05=3 & (tf6 le X6MTH_10 le 14) then SL4=1;
if X6MTH_05=3 & (.< X6MTH_10 < tf6) then exclusivebf=0;
run;

%solidliquid_6(&time,data6ex,FLT=SL1);
%solidliquid_6(&time,data6ex,FLT=SL2);
%solidliquid_6(&time,data6ex,FLT=SL3);
%solidliquid_6(&time,data6ex,FLT=SL4);

%if &type=1 %then %do;
proc means data=data6ex mean;
title "Proportion of exclusive breastfeeding at &time months";
var exclusivebf;
```

```sas
run;
%end;

%mend exclusivebf_6;


*option mprint mlogic macrogen symbolgen;
%exclusivebf_6(time=2,inputdata=data_6); * calculating proportion of
exclusive breastfeeding at 2 months;
%exclusivebf_6(time=2.5,inputdata=data_6);
%exclusivebf_6(time=3,inputdata=data_6);
%exclusivebf_6(time=3.5,inputdata=data_6);
%exclusivebf_6(time=4,inputdata=data_6);
%exclusivebf_6(time=4.5,inputdata=data_6);
%exclusivebf_6(time=5,inputdata=data_6);
%exclusivebf_6(time=5.5,inputdata=data_6);
%exclusivebf_6(time=6,inputdata=data_6);




/*****************************************************************************
***********
Task: Calculate any breastfeeding indicator for 12_month survey
     *

/*****************************************************************************
***********/

* importing 12months .csv data;
* Call the appropriate dataset in OUT="";
* Insert the appropriate .csv dataset in DATAFILE= "" ;
PROC IMPORT OUT= bf.month12data
            DATAFILE= "C:\Users\Sudip\Documents\Sudip-Shared\Infant Feed
ing Surveillance project\data\standard
data\BFI_Online_Export_12mos_Jun2015_Dec2015_te
xt.csv"
            DBMS=CSV REPLACE;
         guessingrows=500;
     GETNAMES=YES;
     DATAROW=2;
RUN;

* Renaming variables to distinguish between 6month and 12month variables;
data data_12;
set bf.month12data (keep=ClientID Q3 -- Q6);
X12MTH_03=input(substr(Q3,7),1.); * recoding the values of variables;
X12MTH_04=input(substr(Q4,7),1.); * If you have different variable names for
12month, please replace, for example, Q4 with appropriate variable;
X12MTH_05=input(substr(Q5,10),1.);
X12MTH_06=input(substr(Q6,10),2.);
drop Q3 -- Q6;
run;



data data_12;
set data_12;
if X12MTH_03=2 | X12MTH_04=2 then exclude12=1;
else exclude12=0;
if exclude12=0; * keeping eligible individuals;
if X12MTH_05>.;
run;



* SAS code to calculate any breastfeeding for 12month survey which takes
time (in months) and 12 months data as arguments;
%macro anybf_12(time,inputdata,type=1);
* Type has no physical meaning; * it just facilitates our calculation in the
longitudinal (common n) case;
%if %sysevalf(&time <6 | &time >=13) & type=1 %then "Time cannot be <6
months or >=13 months";
```

```sas
data data12;
set &inputdata;

t12=.;
if &time<6 then t12=0; * this line is needed to calculate anybf_long for
common n;
if &time >=6 & &time <6.5 then t12=1;
if &time >=6.5 & &time <7 then t12=2;
if &time >=7 & &time <7.5 then t12=3;
if &time >=7.5 & &time <8 then t12=4;
if &time >=8 & &time <8.5 then t12=5;
if &time >=8.5 & &time <9 then t12=6;
if &time >=9 & &time <9.5 then t12=7;
if &time >=9.5 & &time <10 then t12=8;
if &time >=10 & &time <10.5 then t12=9;
if &time >=10.5 & &time <11 then t12=10;
if &time >=11 & &time <11.5 then t12=11;
if &time >=11.5 & &time <12 then t12=12;
if &time >=12 & &time <12.5 then t12=13;
if &time >=12.5 & &time <13 then t12=14;


anybf=.;

if X12MTH_05=1 then anybf=1;
if X12MTH_05=0 & (t12 le X12MTH_06 le 14) then anybf=1;
if  X12MTH_05=0 & (.< X12MTH_06 <t12) then anybf=0;
run;


%if &type=1 %then %do;
proc means data=data12 mean;
title "Proportion of any breastfeeding at &time months";
var anybf;
run;
%end;

%mend anybf_12;

%anybf_12(time=6,inputdata=data_12); * calculating proportion of any
breastfeeding at 6 months;
%anybf_12(time=6.5,inputdata=data_12);
%anybf_12(time=7,inputdata=data_12); * calculating proportion of any
breastfeeding at 7 months;
%anybf_12(time=7.5,inputdata=data_12);
%anybf_12(time=8,inputdata=data_12);
%anybf_12(time=8.5,inputdata=data_12);
%anybf_12(time=9,inputdata=data_12);
%anybf_12(time=9.5,inputdata=data_12);
%anybf_12(time=10,inputdata=data_12);
%anybf_12(time=10.5,inputdata=data_12);
%anybf_12(time=11,inputdata=data_12);
%anybf_12(time=11.5,inputdata=data_12);
%anybf_12(time=12,inputdata=data_12);


* 12months program ends here;




/******************************************************************************
***********
Task: Calculate any and exclusive breastfeeding indicators for common n
(longitudinal)*                                                  *

/******************************************************************************
***********/


* copying the data importing steps again;
```

```sas
libname BF 'C:\Users\Sudip\Documents\Sudip-Shared\Infant Feeding
Surveillance project\data';

* Importing 2month .csv data in SAS;
* Call the appropriate dataset in OUT="";
* Insert the appropriate .csv dataset in DATAFILE= "" ;
PROC IMPORT OUT= bf.month2data
            DATAFILE= "C:\Users\Sudip\Documents\Sudip-Shared\Infant Feed
ing Surveillance project\data\standard
data\BFI_Online_Export_2mos_Jun2015_Dec2015_tex
t.csv"
            DBMS=CSV REPLACE;
        guessingrows=500;
    GETNAMES=YES;
    DATAROW=2;
RUN;

* Importing 6month .csv data in SAS;
* Call the appropriate dataset in OUT="";
* Insert the appropriate .csv dataset in DATAFILE= "" ;
PROC IMPORT OUT= bf.month6data
            DATAFILE= "C:\Users\Sudip\Documents\Sudip-Shared\Infant Feed
ing Surveillance project\data\standard
data\BFI_Online_Export_6mos_Jun2015_Dec2015_tex
t.csv"
            DBMS=CSV REPLACE;
        guessingrows=500;
    GETNAMES=YES;
    DATAROW=2;
RUN;

* Importing 12month .csv data in SAS;
* Call the appropriate dataset in OUT="";
* Insert the appropriate .csv dataset in DATAFILE= "" ;
PROC IMPORT OUT= bf.month12data
            DATAFILE= "C:\Users\Sudip\Documents\Sudip-Shared\Infant Feed
ing Surveillance project\data\standard
data\BFI_Online_Export_12mos_Jun2015_Dec2015_te
xt.csv"
            DBMS=CSV REPLACE;
        guessingrows=500;
    GETNAMES=YES;
    DATAROW=2;
RUN;

data data_2;
set bf.month2data (keep=ClientID Q3 -- Q14);
X2MTH_03=input(substr(Q3,7),1.);
X2MTH_04=input(substr(Q4,7),1.);
X2MTH_07=input(substr(Q7,4),1.);
X2MTH_08=input(substr(Q8,4),1.);
X2MTH_09=input(substr(Q9,4),1.);
X2MTH_10=input(substr(Q10,5),1.);
X2MTH_13=input(substr(Q13,4),1.);
X2MTH_14=input(substr(Q14,5),1.);
drop Q3 -- Q14;
run;

data data_2;
set data_2;
if X2MTH_03=2 | X2MTH_04=2 then exclude2=1;
else exclude2=0;
if exclude2=0;
if X2MTH_07>.;
run;

data data_6;
set bf.month6data (keep=ClientID Q3 -- Q24);
```

```
X6MTH_03=input(substr(Q3,7),1.);
X6MTH_04=input(substr(Q4,7),1.);
X6MTH_05=input(substr(Q5,4),1.);
X6MTH_06=input(substr(Q6,4),1.);
X6MTH_07=input(substr(Q7,8),1.);
X6MTH_08=input(substr(Q8,8),2.);
X6MTH_10=input(substr(Q10,10),2.);
X6MTH_20=input(substr(Q20,4),1.);
X6MTH_22=input(substr(Q22,10),2.);
X6MTH_23=input(substr(Q23,4),1.);
X6MTH_24=input(substr(Q24,4),2.);
drop Q3 -- Q24;
run;


data data_6;
set data_6;
if X6MTH_03=2 | X6MTH_04=2 then exclude6=1;
else exclude6=0;
if exclude6=0;
if X6MTH_05>.;
run;

data data_12;
set bf.month12data (keep=ClientID Q3 -- Q6);
X12MTH_03=input(substr(Q3,7),1.);
X12MTH_04=input(substr(Q4,7),1.);
X12MTH_05=input(substr(Q5,10),1.);
X12MTH_06=input(substr(Q6,10),2.);
drop Q3 -- Q6;
run;


data data_12;
set data_12;
if X12MTH_03=2 | X12MTH_04=2 then exclude12=1;
else exclude12=0;
if exclude12=0;
if X12MTH_05>.;
run;

* next few steps are for merging datasets;
proc sort data=data_2;
by ClientID;
run;

proc sort data=data_6;
by ClientID;
run;

proc sort data=data_12;
by ClientID;
run;

data data_12_6_2; *merged data;
merge data_2 (in =a) data_6 (in=b) data_12 (in=c);
by ClientID;
if a & b & c;
run;


* Steps :     if time is greater than or equal to 7 months, call 12month
program;
*
*            if time is less than 7 months and greater than or equal to 3
months, call 12month programs first,
*            then call the 6month for those participants who have missing
indicator after running 12month program.
*
*            if time is less than 3 months, call 12month programs first,
then call 6month program for the missing participants,
```

```
*               and at the end call 2months program for rest of the missing
participants after running 12month and 6month programs (if any).


* SAS code to calculate any breastfeeding for common n which takes time (in
months) and merge data as arguments;
* To run this program we have to use anybf_2, anybf_6 and anybf_12 programs;
%macro anybf_long1(time,inputdata);

*calling 12month any breastfeeding program;
%anybf_12(&time,&inputdata,type=2);

%if %sysevalf(&time >=7) %then %do;
proc means data=data12 mean;
title "Proportion of any breastfeeding (long) at &time months";
var anybf;
run;
%end;

%if %sysevalf(&time>=3 & &time<7) %then %do;
data data12;
set data12;
if anybf=. then no_meaning_6=1;
else no_meaning_6=0;
run;

 *calling 6month any breastfeeding program;
%anybf_6(&time,data12,type=2);
proc means data=data6 mean;
title "Proportion of any breastfeeding (long) at &time months";
var anybf;
run;
%end;


%if %sysevalf(&time<3) %then %do;
data data6;
set data6;
if anybf=. then No_meaning_2=1;
else No_meaning_2=0;
run;
*calling 2month any breastfeeding program;
%anybf_2(&time,data6,type=2);
proc means data=data2 mean;
title "Any breastfeeding (long) at &time months";
var anybf;
run;
%end;
%mend anybf_long1;


%anybf_long1(time=12,inputdata=data_12_6_2); * calculating proportion of any
breastfeeding (longitudinal) at 12 months;
%anybf_long1(time=10,inputdata=data_12_6_2);
%anybf_long1(time=8,inputdata=data_12_6_2);
%anybf_long1(time=6,inputdata=data_12_6_2); * calculating proportion of any
breastfeeding (longitudinal) at 6 months;
%anybf_long1(time=4,inputdata=data_12_6_2);
%anybf_long1(time=2,inputdata=data_12_6_2); * calculating proportion of any
breastfeeding (longitudinal) at 2 months;



* SAS code to calculate exclusive breastfeeding for common n which takes
time (in months) and merge data as arguments;
* To run this program we have to use exclusivebf_2 and exclusivebf_6
programs;
%macro exclusivebf_long1(time,inputdata);


%if %sysevalf(&time >=7) %then "Time cannot be >=7 months";
```

```sas
%exclusivebf_6(&time,&inputdata,type=2); *calling 6months exclusive
breastfeeding program;


%if %sysevalf(&time>=3 & &time<7) %then %do;
proc means data=data6ex mean;
title "Proportion of exclusive breastfeeding (long) at &time months";
var exclusivebf;
run;
%end;

%if %sysevalf(&time<3) %then %do;
data data6ex;
set data6ex;
if exclusivebf=. then No_meaning_2=1;
else No_meaning_2=0;
run;

%exclusivebf_2(&time,data6ex,type=2); *calling 2months exclusive
breastfeeding program;
proc means data=data2ex mean;
title "Proportion of exclusive breastfeeding (long) at &time months";
var exclusivebf;
run;
%end;
%mend exclusivebf_long1;


%exclusivebf_long1(time=6,inputdata=data_12_6_2); * calculating proportion
of exclusive breastfeeding (longitudinal) at 6 months;
%exclusivebf_long1(time=4,inputdata=data_12_6_2); * calculating proportion
of exclusive breastfeeding (longitudinal) at 4 months;
%exclusivebf_long1(time=2,inputdata=data_12_6_2); * calculating proportion
of exclusive breastfeeding (longitudinal) at 2 months;



* End of SAS syntax;
```

Appendix G – R Syntax to Calculate Any and Exclusive Breastfeeding Indicators

```
############################################################################
########
# Task: Calculate any and exclusive breastfeeding indicators using using        #
# 2months, 6months and 12months survey data provided by Oxford county.       #
# Last modified: February 04, 2018                                 #
# Cross sectional macros: anybf_2, excluxivebf_2, anybf_6, exclusivebf_6      #
#                                          and anybf_12   #
# Macros for longitudinal calculations: anybf_long1, exclusivebf_long1        #
############################################################################
########

# The following R syntax will calculate proportion of any and exclusive breastfeeding
# at a given time (in months). The syntax is based on the variables that
# are provided in the surveys datasets.
#
# Necessary variables for the 2_month survey:
#
# Q7 - In the past week, what have you fed your baby? By this, we mean what milk?
# Q9 - Since birth, have you attempted to breastfeed or provide breastmilk to your baby, even
if only once?
# Q8 - Since birth, including any time spent in hospital, has your baby ever been given any
formula?
# Q10 - How old was your baby in months when you stopped breastfeeding?
# Q13 - Was your baby given formula in hospital?
# Q14 - How old was your baby in months when they were first given formula?
#
# Necessary variables for the 6_month survey:

# Q5 - In the past week, what have you fed your baby? By this, we mean what milk?
# Q6 - Since birth, including any time spent in hospital, has your baby ever been given any
formula?
# Q7 - Since the last time we contacted you, which was when your baby was about 2 months
old, have you tried to breastfeed or provide breastmilk to your baby, even if only once?
# Q8 - How old was your baby in months when you stopped breastfeeding?
# Q10 - How old was your baby in months when they were first given formula?
# Q20 - Since birth, has your baby every been given liquids other than  breastmilk or formula,
such as water, sugar water or juice? Other liquids do not include vitamins or medications.
# Q22 - How old was your baby in months the first time they were given liquids  other than
breastmilk or formula?
# Q23 - Since birth, has your baby ever been given any solid food such as meat, chicken,
cereal, vegetables, or fruit?
# Q24 - How old was your baby, in months, the first time they were given any solid food, such
as meat, chicken, cereal, vegetables, or fruit?
#
# Necessary variables for the 12_month survey:

#  Q5 - In the past week, have you provided breastmilk to your baby?
#  Q6 - How old was your baby in months when you stopped providing  breastmilk?


# Please note this syntax is subject to further modification as necessary in the future.


# first set of programs are for 2months survey
rm(list=ls())
setwd('/media/sf_Sudip-Shared/Infant Feeding Surveillance project/data/standard data') # set
up your working directory to load data
getwd()

library(dplyr) # please load dplyr package if dplyr is not loaded
```

```
##############################################################################
###############
# Task: Calculate any and exclusive breastfeeding indicators for 2_month survey        #
##############################################################################
###############
```

```
# please convert all datasets to .csv format before importing data to R. If you are using .Rdata,
use 'load' commend.
#  Insert the appropriate 2month .csv data inside " "  in the next line;
test_2 <- read.csv("BFI_Online_Export_2mos_Jun2015_Dec2015_text.csv",na.strings = " ") #
reading the 2months data
```

```
# Caution: If you have different variable names in the source dataset other than, for example
Q7 or Q8, please replace these variables (e.g. Q7) with
# appropriate variable names in your dataset. Please insert new names in the data import
steps below.
```

```
data_2<-
test_2%>%select(ClientID,X2MTH_03=Q3,X2MTH_04=Q4,X2MTH_07=Q7,X2MTH_08=Q8,X
2MTH_09=Q9,X2MTH_10=Q10,X2MTH_13=Q13,X2MTH_14=Q14)
```

```
# Renaming variables to distinguish between 2month and 6month variables
data_2<-data_2%>%mutate(X2MTH_03=as.numeric(gsub(".*(.)$","\\1",X2MTH_03)),   #
recoding values of the variables
            X2MTH_04=as.numeric(gsub(".*(.)$","\\1",X2MTH_04)),   # If you have different
variable names for 2month, please replace, for example, Q4 with appropriate variable;
            X2MTH_07=as.numeric(gsub(".*(.)$","\\1",X2MTH_07)),
            X2MTH_09=as.numeric(gsub(".*(.)$","\\1",X2MTH_09)),
            X2MTH_10=as.numeric(gsub(".*(.)$","\\1",X2MTH_10)),
            X2MTH_08=as.numeric(gsub(".*(.)$","\\1",X2MTH_08)),
            X2MTH_13=as.numeric(gsub(".*(.)$","\\1",X2MTH_13)),
            X2MTH_14=as.numeric(gsub(".*(.)$","\\1",X2MTH_14))) # returning the last
string
```

```
data_2<-data_2%>%mutate(Excluded2=ifelse(X2MTH_03==2 | X2MTH_04==2, 1,0)) #
creating an exclude2 variable
data_2<-data_2%>%filter(Excluded2 %in% c(0,NA))
data_2<-data_2%>%filter(!is.na(X2MTH_07))  # removing all individuals with NA response for
2MTH_07
```

```
# R function to calculate any breastfeeding indictor which takes time (in months) and 2month
data as arguments
anybf_2<-function(time,inputdata,type=1)
{
  if( time >= 3){
    stop("Time cannot be >=3 months")
  }

  t2<-findInterval(time,seq(0,3,.5))   # converting time in months

  inputdata$anybf<-NA
  inputdata$anybf[(inputdata$X2MTH_07 %in% c(1,3))]<-1
  inputdata$anybf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09 ==1 &
inputdata$X2MTH_10 %in% c(t2:6)]<-1

  inputdata$anybf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09==0]<-0
  inputdata$anybf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09 ==1 &
inputdata$X2MTH_10 < t2] <-0

  if(type==1){
    return(mean(inputdata$anybf,na.rm = T))
  }else{return(inputdata$anybf)}
}
```

```
anybf_2(0.5,data_2) # proportion of any breast feeding at 0.5 months (or 2 weeks);
anybf_2(1,data_2) # proportion of any breast feeding at 1 months;
anybf_2(2,data_2) # proportion of any breast feeding at 2 months;


# R function to calculate exclusive breastfeeding indictor which takes time (in months) and
2month data as arguments
exclusivebf_2<-function(time,inputdata,type=1)
{

  if( time >= 3 & type==1){
    stop("Time cannot be >=3 months")
  }

  t2<-findInterval(time,seq(0,3,.5)) # converting time in months

  # pathway 1: where baby had breastmilk, refer to figure 1 in LDCP Core Indicator
documentation
  inputdata$exclusivebf<-NA
  inputdata$exclusivebf[inputdata$X2MTH_07==1 & inputdata$X2MTH_08 %in% c(0)]<-1
  inputdata$exclusivebf[inputdata$X2MTH_07==1 & inputdata$X2MTH_08==1 &
inputdata$X2MTH_13==0 & inputdata$X2MTH_14 %in% c(t2:6)]<-1
  inputdata$exclusivebf[inputdata$X2MTH_07==1 & inputdata$X2MTH_08==1 &
inputdata$X2MTH_13==0 &inputdata$X2MTH_14 < t2]<-0
  inputdata$exclusivebf[inputdata$X2MTH_07==1 & inputdata$X2MTH_08==1 &
inputdata$X2MTH_13==1]<-0

  # pathway 2: where baby had formula, refer to figure 2 in LDCP Core Indicator documentation
  inputdata$exclusivebf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09==1 &
inputdata$X2MTH_10 %in% c(t2:6) & inputdata$X2MTH_13==0 & inputdata$X2MTH_14
%in% c(t2:6)]<-1
  inputdata$exclusivebf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09==1 &
inputdata$X2MTH_10 < t2]<-0
  inputdata$exclusivebf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09 %in% c(0)]<-0
  inputdata$exclusivebf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09==1 &
inputdata$X2MTH_10 %in% c(t2:6) & inputdata$X2MTH_13==0 & inputdata$X2MTH_14 <
t2]<-0
  inputdata$exclusivebf[inputdata$X2MTH_07==2 & inputdata$X2MTH_09==1 &
inputdata$X2MTH_10 %in% c(t2:6) & inputdata$X2MTH_13==1]<-0


  # pathway 3: where baby had combination of breastfeeding and formula, refer to figure 3 in
LDCP Core Indicator documentation
  inputdata$exclusivebf[inputdata$X2MTH_07==3 & inputdata$X2MTH_13==0 &
inputdata$X2MTH_14 %in% c(t2:6)]<-1
  inputdata$exclusivebf[inputdata$X2MTH_07==3 & inputdata$X2MTH_13==0 &
inputdata$X2MTH_14 < t2]<-0
  inputdata$exclusivebf[inputdata$X2MTH_07==3 & inputdata$X2MTH_13==1]<-0

  if(type==1){
    return(mean(inputdata$exclusivebf,na.rm = T))
  }else{return(inputdata$exclusivebf)}

}

exclusivebf_2(0.5,data_2) # proportion of exclusive breastfeeding at 0.5 months;
exclusivebf_2(1,data_2) # proportion of exclusive breastfeeding at 1 months;
exclusivebf_2(2,data_2) # proportion of exclusive breastfeeding at 2 months;
```

```
###############################################################################
###############
# Task: Calculate any and exclusive breastfeeding indicators for 6_month survey      #
###############################################################################
###############

#  Insert the appropriate 6month .csv data inside " "  in the next line;
test_6 <- read.csv("BFI_Online_Export_6mos_Jun2015_Dec2015_text.csv",na.strings = " ") #
reading the 6months data


data_6<-
test_6%>%select(ClientID,X6MTH_03=Q3,X6MTH_04=Q4,X6MTH_05=Q5,X6MTH_06=Q6,X
6MTH_07=Q7,X6MTH_08=Q8,X6MTH_10=Q10,X6MTH_20=Q20,X6MTH_22=Q22,X6MTH_2
3=Q23,X6MTH_24=Q24)

data_6<-
data_6%>%mutate(X6MTH_08=as.numeric(substr(X6MTH_08,8,nchar(as.character(X6MTH_
08)))), # recoding values of the variables

X6MTH_10=as.numeric(substr(X6MTH_10,10,nchar(as.character(X6MTH_10)))),

X6MTH_22=as.numeric(substr(X6MTH_22,10,nchar(as.character(X6MTH_22)))),

X6MTH_24=as.numeric(substr(X6MTH_24,4,nchar(as.character(X6MTH_24)))))

data_6<-data_6%>%mutate(X6MTH_03=as.numeric(gsub(".*(.)$","\\1",X6MTH_03)), #
recoding values of the variables
                X6MTH_04=as.numeric(gsub(".*(.)$","\\1",X6MTH_04)),
                X6MTH_05=as.numeric(gsub(".*(.)$","\\1",X6MTH_05)),
                X6MTH_07=as.numeric(gsub(".*(.)$","\\1",X6MTH_07)),
                X6MTH_06=as.numeric(gsub(".*(.)$","\\1",X6MTH_06)),
                X6MTH_20=as.numeric(gsub(".*(.)$","\\1",X6MTH_20)),
                X6MTH_23=as.numeric(gsub(".*(.)$","\\1",X6MTH_23))) # returning the last
string


data_6<-data_6%>%mutate(Excluded6=ifelse(X6MTH_03==2 | X6MTH_04==2, 1,0)) #
creating an exclude6 variable
data_6<-data_6%>%filter(Excluded6 %in% c(0,NA))
data_6<-data_6%>%filter(!is.na(X6MTH_05))  # removing all individuals with NA response for
6MTH_05

# R function to calculate any breastfeeding indictor which takes time (in months) and 6month
data as arguments
anybf_6<-function(time,inputdata,type=1)
{
  if((time < 2 | time >= 7) & type==1){
    stop("Time cannot be <2 months or >=7 months")
  }
  tb6<-ifelse(time>=2 & time<7,findInterval(time,seq(2,7,.5)),NA) # converting time in months

  inputdata$anybf<-NA
  inputdata$anybf[(inputdata$X6MTH_05 %in% c(1,3))]<-1
  inputdata$anybf[inputdata$X6MTH_05==2 & inputdata$X6MTH_07 %in% c(0)]<-0

  if(!is.na(tb6)){
    inputdata$anybf[inputdata$X6MTH_05==2 & inputdata$X6MTH_07 ==1 &
inputdata$X6MTH_08 %in% c(tb6:10)]<-1
    inputdata$anybf[inputdata$X6MTH_05==2 & inputdata$X6MTH_07 ==1 &
inputdata$X6MTH_08 < tb6] <-0
  }
```

```
   if(type==1){
     return(mean(inputdata$anybf,na.rm = T))
   }else{return(inputdata$anybf)}
}


anybf_6(2,data_6) # proportion of any breast feeding at 2 months;
anybf_6(4,data_6) # proportion of any breast feeding at 4 months;
anybf_6(6,data_6) # proportion of any breast feeding at 6 months;


# solidliquid_6 function is created to calculate the repetitive piece of exclusive breastfeeding
indicator

# Indicators defined for breastfeeding stopping time is not similar to indicators for introduction
time of formula, solid and liquid

solidliquid_6<-function(time,idata) # time in month
{

  tf6<-ifelse(time<7 & time >=0,findInterval(time,seq(0,7,.5)),NA)
  idata$exclusivebf[idata$X6MTH_20==0 & idata$X6MTH_23==0]<-1
  idata$exclusivebf[idata$X6MTH_20==0 & idata$X6MTH_23 ==1 & idata$X6MTH_24 %in%
c(tf6:14)]<-1


  idata$exclusivebf[idata$X6MTH_20==1 & idata$X6MTH_22 %in% c(tf6:14) &
idata$X6MTH_23==0]<-1
  idata$exclusivebf[idata$X6MTH_20==1 & idata$X6MTH_22 %in% c(tf6:14) &
idata$X6MTH_23 ==1 & idata$X6MTH_24 %in% c(tf6:14)]<-1


  idata$exclusivebf[idata$X6MTH_20==0 & idata$X6MTH_23 ==1 & idata$X6MTH_24 <tf6]<-0
  idata$exclusivebf[idata$X6MTH_20==1 & idata$X6MTH_22 <tf6]<-0
  idata$exclusivebf[idata$X6MTH_20==1 & idata$X6MTH_22 %in% c(tf6:14) &
idata$X6MTH_23==1 & idata$X6MTH_24 <tf6]<-0

  return(idata$exclusivebf)
}


# R function to calculate exclusive breastfeeding indictor which takes time (in months) and
6month data as arguments
exclusivebf_6<-function(time,inputdata,type=1)
{
  if((time < 2 | time >= 7) & type==1){
    stop("Time cannot be <2 months or >=7 months")
  }

  tb6<-findInterval(time,seq(2,7,.5))
  tf6<-findInterval(time,seq(0, 7,.5))

  inputdata$exclusivebf<-NA

  # pathway 1: where baby had breastmilk, refer to figure 4 in LDCP Core Indicator
documentation
  inputdata$exclusivebf[inputdata$X6MTH_05==1 & inputdata$X6MTH_06 ==0]<-
solidliquid_6(time,inputdata[inputdata$X6MTH_05==1 & inputdata$X6MTH_06 ==0,]) # calling
solidliquid program
  inputdata$exclusivebf[inputdata$X6MTH_05==1 & inputdata$X6MTH_06==1 &
inputdata$X6MTH_10 %in% c(tf6:14)]<-solidliquid_6(time,inputdata[inputdata$X6MTH_05==1
& inputdata$X6MTH_06==1 & inputdata$X6MTH_10 %in% c(tf6:14),])
  inputdata$exclusivebf[inputdata$X6MTH_05==1 & inputdata$X6MTH_06==1 &
inputdata$X6MTH_10 < tf6]<-0
```

```
  # pathway 2: where baby had formula, refer to figure 5 in LDCP Core Indicator documentation
   inputdata$exclusivebf[inputdata$X6MTH_05==2 & inputdata$X6MTH_07==1 &
inputdata$X6MTH_08 %in% c(tb6:10) & inputdata$X6MTH_10 %in% c(tf6:14)]<-
solidliquid_6(time,inputdata[inputdata$X6MTH_05==2 & inputdata$X6MTH_07==1 &
inputdata$X6MTH_08 %in% c(tb6:10) & inputdata$X6MTH_10 %in% c(tf6:14),])
   inputdata$exclusivebf[inputdata$X6MTH_05==2 & inputdata$X6MTH_07==1 &
inputdata$X6MTH_08 < tb6]<-0
   inputdata$exclusivebf[inputdata$X6MTH_05==2 & inputdata$X6MTH_07==0]<-0
   inputdata$exclusivebf[inputdata$X6MTH_05==2 & inputdata$X6MTH_07==1 &
inputdata$X6MTH_08 %in% c(tb6:10) & inputdata$X6MTH_10 < tf6]<-0


  # pathway 3: where baby had combination of breastfeeding and formula, refer to figure 6 in
LDCP Core Indicator documentation
   inputdata$exclusivebf[inputdata$X6MTH_05==3 & inputdata$X6MTH_10 %in% c(tf6:14)]<-
solidliquid_6(time,inputdata[inputdata$X6MTH_05==3 & inputdata$X6MTH_10 %in%
c(tf6:14),]) # calling solidliquid program
   inputdata$exclusivebf[inputdata$X6MTH_05==3 & inputdata$X6MTH_10 < tf6]<-0

  if(type==1){
    return(mean(inputdata$exclusivebf,na.rm = T))
  }else{return(inputdata$exclusivebf)}
}

exclusivebf_6(2,data_6)  # proportion of exclusive breastfeeding at 2 months;
exclusivebf_6(4,data_6)  # proportion of exclusive breastfeeding at 4 months;
exclusivebf_6(6,data_6)  # proportion of exclusive breastfeeding at 6 months;




###############################################################################
###############
# Task: Calculate any breastfeeding indicator for 12_months survey             #
###############################################################################
###############

#  Insert the appropriate 12month .csv data inside " "  in the next line;
test_12 <- read.csv("BFI_Online_Export_12mos_Jun2015_Dec2015_text.csv",na.strings = " ")
# reading 12 months data
#data_12<-test_12%>%select(ClientID,contains("X12"),-matches("R")) # selecting variables
needed for calculating
data_12<-
test_12%>%select(ClientID,X12MTH_03=Q3,X12MTH_04=Q4,X12MTH_05=Q5,X12MTH_06
=Q6)

data_12<-
data_12%>%mutate(X12MTH_06=as.numeric(substr(X12MTH_06,10,nchar(as.character(X12
MTH_06))))) # recoding the variable




data_12<-data_12%>%mutate(X12MTH_03=as.numeric(gsub(".*(.)$","\\1",X12MTH_03)),
                X12MTH_04=as.numeric(gsub(".*(.)$","\\1",X12MTH_04)),
                X12MTH_05=as.numeric(gsub(".*(.)$","\\1",X12MTH_05)))  # returning the last
string

data_12<-data_12%>%mutate(Excluded12=ifelse(X12MTH_03==2 | X12MTH_04==2, 1,0))
data_12<-data_12%>%filter(Excluded12 %in% c(0,NA))
data_12<-data_12%>%filter(!is.na(X12MTH_05))
```

```r
# R function to calculate any breastfeeding indictor which takes time (in months) and 12month
data as arguments
anybf_12<-function(time,inputdata,type=1)
{
  if((time < 6 | time >= 13) & type==1){
    stop("Time cannot be <6 months or >=13 months")
  }


  t12<-findInterval(time,seq(6,13,.5)) # converting time in months

  inputdata$anybf<-NA

  inputdata$anybf[(inputdata$X12MTH_05==1)]<-1

  if(!is.na(t12)){
    inputdata$anybf[inputdata$X12MTH_05==0 & inputdata$X12MTH_06 %in% c(t12:14)]<-1
    inputdata$anybf[inputdata$X12MTH_05==0 & inputdata$X12MTH_06 <t12]<-0
  }

  if(type==1){
    return(mean(inputdata$anybf,na.rm = T))
  }else{return(inputdata$anybf)}

}

anybf_12(6,data_12)  # proportion of any breastfeeding at 6 months;
anybf_12(8,data_12)  # proportion of any breastfeeding at 8 months;
anybf_12(10,data_12)  # proportion of any breastfeeding at 10 months;
anybf_12(12,data_12)  # proportion of any breastfeeding at 12 months;

############################################################################
##############
# Task: Calculate any and exclusive breastfeeding indicators for for paticipants        #
# completed all three surveys (longitudinal)                                   #
############################################################################
###############


# First part of the code is used to merge all three datasets
# Copying the data importing steps again;
library(dplyr)
#  Insert the appropriate 2month .csv data inside " "  in the next line;
test_2 <- read.csv("BFI_Online_Export_2mos_Jun2015_Dec2015_text.csv",na.strings = " ")
data_2<-
test_2%>%select(ClientID,X2MTH_03=Q3,X2MTH_04=Q4,X2MTH_07=Q7,X2MTH_08=Q8,X
2MTH_09=Q9,X2MTH_10=Q10,X2MTH_13=Q13,X2MTH_14=Q14)


data_2<-data_2%>%mutate(X2MTH_03=as.numeric(gsub(".*(.)$","\\1",X2MTH_03)),   #
recoding values of the variables
                X2MTH_04=as.numeric(gsub(".*(.)$","\\1",X2MTH_04)),
                X2MTH_07=as.numeric(gsub(".*(.)$","\\1",X2MTH_07)),
                X2MTH_09=as.numeric(gsub(".*(.)$","\\1",X2MTH_09)),
                X2MTH_10=as.numeric(gsub(".*(.)$","\\1",X2MTH_10)),
                X2MTH_08=as.numeric(gsub(".*(.)$","\\1",X2MTH_08)),
                X2MTH_13=as.numeric(gsub(".*(.)$","\\1",X2MTH_13)),
                X2MTH_14=as.numeric(gsub(".*(.)$","\\1",X2MTH_14))) # returning the last
string

data_2<-data_2%>%mutate(Excluded2=ifelse(X2MTH_03==2 | X2MTH_04==2, 1,0)) #
creating an exclude2 variable
data_2<-data_2%>%filter(Excluded2 %in% c(0,NA))
data_2<-data_2%>%filter(!is.na(X2MTH_07))
```

```
#  Insert the appropriate 6month .csv data inside " "  in the next line;
test_6 <- read.csv("BFI_Online_Export_6mos_Jun2015_Dec2015_text.csv",na.strings = " ")
data_6<-
test_6%>%select(ClientID,X6MTH_03=Q3,X6MTH_04=Q4,X6MTH_05=Q5,X6MTH_06=Q6,X
6MTH_07=Q7,X6MTH_08=Q8,X6MTH_10=Q10,X6MTH_20=Q20,X6MTH_22=Q22,X6MTH_2
3=Q23,X6MTH_24=Q24)


data_6<-
data_6%>%mutate(X6MTH_08=as.numeric(substr(X6MTH_08,8,nchar(as.character(X6MTH_
08)))), # recoding values of the variables

X6MTH_10=as.numeric(substr(X6MTH_10,10,nchar(as.character(X6MTH_10)))),

X6MTH_22=as.numeric(substr(X6MTH_22,10,nchar(as.character(X6MTH_22)))),

X6MTH_24=as.numeric(substr(X6MTH_24,4,nchar(as.character(X6MTH_24)))))

data_6<-data_6%>%mutate(X6MTH_03=as.numeric(gsub(".*(.)$","\\1",X6MTH_03)), #
recoding values of the variables
            X6MTH_04=as.numeric(gsub(".*(.)$","\\1",X6MTH_04)),
            X6MTH_05=as.numeric(gsub(".*(.)$","\\1",X6MTH_05)),
            X6MTH_07=as.numeric(gsub(".*(.)$","\\1",X6MTH_07)),
            X6MTH_06=as.numeric(gsub(".*(.)$","\\1",X6MTH_06)),
            X6MTH_20=as.numeric(gsub(".*(.)$","\\1",X6MTH_20)),
            X6MTH_23=as.numeric(gsub(".*(.)$","\\1",X6MTH_23))) # returning the last
string



data_6<-data_6%>%mutate(Excluded6=ifelse(X6MTH_03==2 | X6MTH_04==2, 1,0)) #
creating an exclude6 variable
data_6<-data_6%>%filter(Excluded6 %in% c(0,NA))
data_6<-data_6%>%filter(!is.na(X6MTH_05))  # removing all individuals with NA response for
6MTH_05



#  Insert the appropriate 12month .csv data inside " "  in the next line;
test_12 <- read.csv("BFI_Online_Export_12mos_Jun2015_Dec2015_text.csv",na.strings = " ")
data_12<-
test_12%>%select(ClientID,X12MTH_03=Q3,X12MTH_04=Q4,X12MTH_05=Q5,X12MTH_06
=Q6)

data_12<-
data_12%>%mutate(X12MTH_06=as.numeric(substr(X12MTH_06,10,nchar(as.character(X12
MTH_06))))) # recoding the variable



data_12<-data_12%>%mutate(X12MTH_03=as.numeric(gsub(".*(.)$","\\1",X12MTH_03)),
            X12MTH_04=as.numeric(gsub(".*(.)$","\\1",X12MTH_04)),
            X12MTH_05=as.numeric(gsub(".*(.)$","\\1",X12MTH_05)))  # returning the last
string

data_12<-data_12%>%mutate(Excluded12=ifelse(X12MTH_03==2 | X12MTH_04==2, 1,0))
data_12<-data_12%>%filter(Excluded12 %in% c(0,NA))
data_12<-data_12%>%filter(!is.na(X12MTH_05))


data_12_6<-merge(data_12,data_6,by="ClientID")
data_12_6_2<-merge(data_12_6,data_2, by="ClientID")
```

```
# Steps :    if time is greater than or equal to 7 months, call 12month program;
#
#          if time is less than 7 months and greater than or equal to 3 months, call 12month
programs first,
#          then call the 6month for those participants who have missing indicator after running
12month program.
#
#          if time is less than 3 months, call 12month programs first, then call 6month program
for the missing participants,
#          and at the end call 2months program for rest of the missing participants after running
12month and 6month programs (if any).
#


# R function to calculate any breastfeeding indictor which takes time (in months) and merged
dataset (2month, 6month and 12month) as arguments
anybf_long1<-function(time,inputdata)
{
  if(time>=7)
  {
    return(anybf_12(time,inputdata,type=1))
  }

  if (time>=3 & time<7)
  {
    inputdata$anybf_long<-anybf_12(time,inputdata,type=2) # calling any breastfeeding
program for 12month
    if(sum(is.na(inputdata$anybf_long)) > 0){
      inputdata$anybf_long[is.na(inputdata$anybf_long)]<-
anybf_6(time,inputdata[is.na(inputdata$anybf_long),],type=2) # calling any breastfeeding
program for 6month
    }
    return(mean(inputdata$anybf_long,na.rm = T))

  }

  else{
    inputdata$anybf_long<-anybf_12(time,inputdata,type = 2) # calling any breastfeeding
program for 12month
    if(sum(is.na(inputdata$anybf_long)) > 0){
      inputdata$anybf_long[is.na(inputdata$anybf_long)]<-
anybf_6(time,inputdata[is.na(inputdata$anybf_long),],type=2) # calling any breastfeeding
program for 6month
      if(sum(is.na(inputdata$anybf_long)) > 0){
        inputdata$anybf_long[is.na(inputdata$anybf_long)]<-
anybf_2(time,inputdata[is.na(inputdata$anybf_long),],type=2) # calling any breastfeeding
program for 2month
      }
    }
    return(mean(inputdata$anybf_long,na.rm = T))
  }
}

anybf_long1(2,data_12_6_2)  # proportion of any breastfeeding (longitudinal) at 2 months;
anybf_long1(4,data_12_6_2)  # proportion of any breastfeeding (longitudinal) at 4 months;
anybf_long1(6,data_12_6_2)  # proportion of any breastfeeding (longitudinal) at 6 months;
anybf_long1(8,data_12_6_2)  # proportion of any breastfeeding (longitudinal) at 8 months;
anybf_long1(10,data_12_6_2)  # proportion of any breastfeeding (longitudinal) at 10 months;
anybf_long1(12,data_12_6_2)  # proportion of any breastfeeding (longitudinal) at 12 months;
```

```r
# R function to calculate exclusive breastfeeding indictor which takes time (in months) and
merged dataset (2month, 6month and 12month) as arguments
exclusive_long1<-function(time,inputdata)
{
  if(time >6.5){
    stop("Time cannot be more than 6.5 months")
  }

  if (time>2.5 & time<=6.5)
  {
    inputdata$exclusive_long<-exclusivebf_6(time,inputdata,type=2) # calling exclusive
breastfeeding program for 6month
    return(mean(inputdata$exclusive_long,na.rm = T))
  }

  else{inputdata$exclusive_long<-exclusivebf_6(time,inputdata,type=2)
  if(sum(is.na(inputdata$exclusive_long)) > 0){
    inputdata$exclusive_long[is.na(inputdata$exclusive_long)]<-
exclusivebf_2(time,inputdata[is.na(inputdata$exclusive_long),],type=2) # calling exclusive
breastfeeding program for 2month
  }
  return(mean(inputdata$exclusive_long,na.rm = T))
  }
}


exclusive_long1(2,data_12_6_2) # proportion of exclusive breastfeeding (longitudinal) at 2
months;
exclusive_long1(4,data_12_6_2) # proportion of exclusive breastfeeding (longitudinal) at 4
months;
exclusive_long1(6,data_12_6_2) # proportion of exclusive breastfeeding (longitudinal) at 6
months;



# End of R syntax
```