

Bristol Stool Chart Implementation Tool Kit

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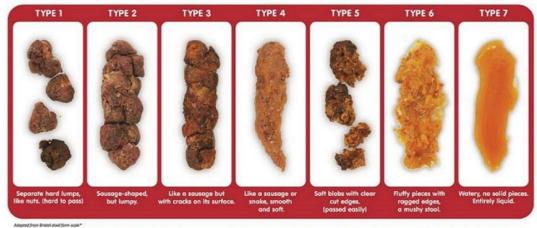
Executive Summary

Introduction

One Village Partners developed this toolkit as part of our Monitoring and Evaluation Framework. This document represents a piece of the overall framework and OneVillage Partners' model, which strives toward the outcomes presented in our Theory of Change. The survey was tailored specifically for the communities the organization works with in Sierra Leone, any external adaptation should consider the intended participants' cultural context and capacity. The intent of creating this toolkit is to increase the use of community-led approaches within international development. For further information please visit our website or contact enquiries@onevillagepartners.org

Bristol Stool Chart- What is it?

The Bristol Stool Chart (BSC) is a low-cost tool that can significantly improve the accuracy of reported diarrhea prevalence as compared to traditional methods. It was originally developed in Bristol, England, as a means for patients with Irritable Bowel Syndrome (IBS) to describe their symptoms. The Chart divides stool into seven different types, varying in "form and consistency". Type one is the hardest type of stool, whereas type seven is completely liquid, differentiating between severe constipation (type one) and severe diarrhea (type seven). The chart can showcase the different stool types using words, drawings, pictures, or 3-D molds. The BSC is a participatory tool that can be used to show changes in diarrhea prevalence over time.



One version of the Bristol Stool Chart

When to Use the Bristol Stool Chart

Does your organization want to:

- Estimate diarrheal prevalence in a population
- Measure large changes in diarrheal prevalence over time or between groups
- Implement a survey with field staff rather than medical professionals
- Provide evidence of impact for a water, sanitation, or hygiene intervention
- Demonstrate improvements in health status (e.g. maternal health, child health)

Are you working with:

- Limited time for data collection
- Limited budget
- Limited statistical and epidemiological skills
- Data collectors and/or study participants with low literacy²



Study Design Questions

When deciding how to implement the BSC the following questions should be considered:

- ✓ Will you use a control group?
- ✓ What sampling strategy will you use?
- ✓ When will you collect data? How often?
- ✓ What is the most effective way to display and explain the BSC to study participants?
- ✓ Do you want to add any other questions to the survey?
- ✓ What is the best way to implement the survey?
- ✓ How will the local context affect the data? What steps will you take to address that?
- ✓ What is the best way to share results with participants?



Prior to implementing the survey, the instrument should be pretested and revised as needed, and staff trained on its use. Data is then collected using visual aids. Data is then analyzed to



A young child participating in the BSC

calculate the prevalence of diarrhea at the time of data collection. If data was collected at multiple time points, it can be compared to assess if any change in prevalence occurred over time. When results are shared with study participants, they can be a great motivator to sustain hygienic behavior change (such as continued use of latrines) and maintain the positive changes in diarrhea prevalence. Results can also be a strong piece of evidence of the effectiveness of the intervention (especially if the results are sustained over time).

Lessons Learned

- Regular debriefs with staff highlight data collection issues and improve data quality.
- Tailor data collection methods to fit with your partner communities and organizational capacity.
- Communication and transparency with key stakeholders are important.
- Hours of data collection may need to be adjusted to ensure inclusion of certain participants.
- Local contextual factors can highly influence data.

Limitations

- If the BSC is implemented as a stand-alone method, it is very difficult to understand what contributes to diarrhea prevalence.
- This survey may not work in cultures where discussing feces is taboo.
- The survey relies on self-report, there is no way to verify the data provided by the participant.
- The BSC is useful at identifying stool on either end of the spectrum, but it is more difficult to measure small changes to diarrhea prevalence.
- The BSC is a good preliminary diagnostic tool, but it cannot substitute for actual stool tests to identify infections and medical conditions.
- The BSC depends on the ability to actually see one's stool post-defecation; certain types of waste management systems, may not enable the use of the BSC.



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Acronyms

Acronym	Definition
BSC	Bristol Stool Chart
IBS	Irritable Bowel Syndrome
MEL	Monitoring, Evaluation, and Learning
WASH	Water, Sanitation, and Hygiene

Acknowledgements

One Village Partners would like to thank our partner communities, who provided their time and valuable insight to help us undertake and improve this survey. To our data collection staff, we are grateful for your dedication to your work which has allowed us to utilize innovative assessments contextualized for our communities. We also recognize the Monitoring, Evaluation, and Learning staff that worked diligently to train data collection staff, oversee field work, analyze data, collate results for community feedback, lead debriefs on how to improve the process, and finalize this report. The tool kit was authored by Christina Bowles, Monitoring, Evaluation and Learning Manager. The introduction section was researched and drafted by Leah McMillan Polonenko. Pictures throughout the tool kit were taken by OneVillage Partners staff.

Who This Guide is For

As OneVillage Partners began to explore the feasibility of implementing the Bristol Stool Chart to measure diarrhea prevalence, we found a significant gap in the literature of how this survey could be implemented in the international development setting. There was no real How-To guide for implementing BSC in a rural community setting (outside of a health center). This toolkit is written to enable practitioners and M&E experts to envision their own process for BSC that works best for the communities in which they work.

OneVillage Partners

The cornerstone of OneVillage Partners' approach is that development is community-led; interventions are inspired, created, and implemented by community members. The organization believes that local people are integral in developing community solutions to their self-defined needs, and that broad participation and local change agents are necessary for ongoing community development. By focusing concurrently on training and infrastructure, participants gain tangible skills to further their own development after the organization's exit while supplementing local infrastructure to meet a community's felt needs. The organization's values of community-leadership, equity, sustainability, and discipline stimulate unity and a collective sense of ownership among community members.

Monitoring, Evaluation, and Learning (MEL) Strategy

OneVillage Partners' MEL strategy is highly participatory and serves two purposes. First, to include community members in the evaluation of their projects to promote learning, growth, and capacity development. Second, to inform the constantly adapting programs that the organization implements. OneVillage Partners' approach is inclusive and aims to engage all stakeholders. The organization utilizes a mixed-methods approach—utilizing both quantitative and qualitative data—to monitor, evaluate, and learn about the programs the organization implements and the outcomes they produce. The Bristol Stool Chart is one piece of a comprehensive Monitoring, Evaluation, and Learning Plan.



Introduction to the Bristol Stool Chart

Bristol Stool Chart- What is it?

The Bristol Stool Chart (BSC, also known as the Bristol Stool Form Scale- BSFS) was developed in Bristol, England, as a means for patients with Irritable Bowel Syndrome (IBS) to describe their symptoms. The Chart divides stool into seven different types, varying in "form and consistency"¹. Type one is the hardest type of stool, whereas type seven is completely liquid, differentiating between severe constipation (type one) and severe diarrhea (type seven). Types four and five indicate optimal health. The original Chart showcases the different stool types using words and pictures. More recent uses of the Chart, especially in developing contexts where illiteracy may be common, are models or images that can be touched or viewed. See **Appendix 1** for some examples of the BSC (there are many other variations available online).

Historical Use of the Bristol Stool Chart

The BSC was not originally created with the intent of meeting the needs of the development context, rather it was created for measuring irritable bowel syndrome and constipation. The first medical article on the BSC was published in 1997 by Lewis and Heaton and focused on the ability for the chart to involve patients in the measurement of their own stool ³. It was confirmed that examining stool type, rather than frequency of defecation, is a better indication of health; thus, the BSC is useful in examining a patient's wellbeing ³. The BSC is particularly effective in its ability to involve patients in their own health care. The BSC is also useful in that it has "no psychological barriers or metaphysics inconveniences for its use" 4. Thus, it enables communities to benefit without any threats to safety owing to their voluntary involvement. While the Chart can assist health practitioners with diagnosing patients, it involves patients in the process. It also enables patients to track their stool in a way that no medical practitioner could, given the ability for a patient to observe their own feces for a longer period of time 5.

Validity & Reliability

Studies across age groups have indicated the validity and reliability of the BSC. Blake et al. conducted a test of the use of the BSC with IBS patients in order to assess the validity and reliability of the chart. It appears that the most extreme cases of stool, namely Types 1 and 7, offer the greatest degree of validity and reliability, in part because patients are most able to identify them ⁶. They concluded that "Overall the BSFS [BSC] demonstrated concurrent validity and construct validity, and showed substantial reliability" 6. They suggested that issues pertaining to the validity and reliability of the data is from patient error in understanding the varying categories. A study by Lane et al. (2011) on children using a modified version of the BSC with only five stool types, concluded that the tool was reliable and valid for use in children with a lower age limit of six years old. Older children were significantly more likely to correctly identify the stool type than younger children and all age groups performed better when the descriptors were both shown and read aloud, indicating that reliability can be increased if patients are given the description in a multitude of ways, using as many senses as possible.⁷

The BSC is a low-cost tool that can significantly improve the accuracy of reported diarrhea prevalence as compared to traditional methods. A study in Ethiopia assessed the stool of 2,398 children with three methods, (1) trained laboratory technicians (2) caregiver interview, and (3) caregiver report using the BSC.8 They found when parents used the BSC, their reports were more accurate (as compared to the laboratory technician's assessment of their child's stool) then when they were asked about diarrhea symptoms verbally (using the terms "loose" or "watery").8 A study by Saps et al. (2013) compared a visual BSC to 3-D models of stool types with children age 6-16 who were asked to classify stool as hard, loose, or normal. The study found that less than a third of children could accurately classify stool types using



either medium, meaning that if the children were asked if they had experienced hard, loose, or normal stool, the majority would answer incorrectly.

Uses of the Bristol Stool Chart

The BSC is especially beneficial when attempting to measure major diseases and issues that present symptoms through stool, including diarrhea and constipation. It is especially helpful when the following needs arise:2

- Estimating diarrheal prevalence in a population
- Measuring large changes in diarrheal prevalence over time or between groups
- Field staff rather than medical professionals are collecting the data
- Limited time for data collection
- Limited statistical and epidemiological skills
- Data collectors and/or program participants have low literacy

High diarrhea prevalence (as measured by the BSC) can be an indication of inadequate water and sanitation facilities, lack of proper handwashing practices, risk of infant and child mortality, and overall low socioeconomic development levels. 10,11

Implementation Methods

The BSC can be implemented in a variety of ways depending on the needs of the research. For studies hoping to assess chronic conditions and determine treatment plans and efficacy for individuals, a longer recall period (1-2 weeks) and more frequent data collection are suggested. Sometimes participants are asked to keep a diary of their bowel movements, classifying each one using the BSC. Studies that hope to provide a snapshot of the prevalence of certain conditions only collect data at certain time points and most times ask about the participant's last bowel movement rather than a history of their bowel movements over a longer time period. The BSC itself can vary by study; some research uses written descriptions of the different stool types, while other studies utilize diagrams, pictures, or physical molds. Sampling methods are also determined by the study; random sampling is often thought to be the gold standard, but purposive sampling could be chosen to make sure participants with certain demographic characteristics (i.e. socioeconomic status, water source, gender, age, etc.) are included. The implementing agency should consider many factors when designing the survey and deciding on implementation methods.

OneVillage Partners' use of the Bristol Stool Chart

One Village Partners started using the BSC in 2017 to measure community-wide diarrhea prevalence in all age groups. We implement a quasi-experimental before-after time series design with a cohort. The survey takes place in communities that complete WASH projects (either latrine or water well construction). Baseline data is collected before project handover, midline 3-6 months after project handover (depending on seasonality and project timelines) and endline one year after project handover. A subset of households is randomly selected by strata (community section in the case of OneVillage Partners) to participate at baseline and those same households are followed up with at midline and endline. Households are replaced at midline and endline if no one is home at the time of data collection.

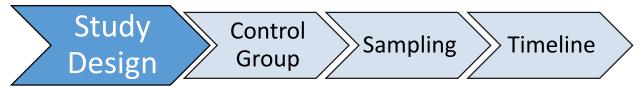


Field Work Preparation

The following section outlines different questions researchers should ask themselves when designing a BSC survey appropriate for their study population. The blue boxes summarize how OneVillage Partners answered these questions during study design and implementation.

Study and Instrument Design

The first step in contextualizing the BSC for your organization is to decide how best it can fit your evaluative needs during study design, instrument design, and implementation.



Will you use a control group? Ideally, the survey would be implemented in both a control group and an experimental group with similar sociodemographic characteristics to determine if any change in the intervention group was due to the intervention or due to other factors. However, a true experimental design may not be feasible for all organizations or partner communities due to resource limitations. Additionally, the goal of the research can help determine if a control group is necessary.

We chose not to have a control group because the goal of the survey is to show the impact of the project within the community itself, that is possible using only an intervention group.

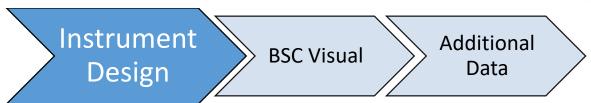
What sampling strategy will you use? The sampling strategy and size will be determined by the research question. Who do you want to include in your survey and what level of impact are you trying to demonstrate? If doing a community wide survey, random selection or stratified selection could be the best choice. If there is a certain group of people you would like to include, a purposive sampling strategy could reflect that. Implementing the BSC at a health clinic or a school would call for a different approach.

We conduct a community-wide survey with a subset of households chosen via proportionate stratified random sampling. At each household we interview anyone that chooses to participate. It is important to us to have data from all types of community members since communities design WASH projects to improve the health of everyone in a community.

When will you collect data? How often? Determination of a data collection timeline will be heavily influenced by organizational and contextual factors. Generally, a baseline, midline, and endline assessment are scheduled for studies aiming to measure diarrhea prevalence over time. The baseline occurs before the intervention takes place, the midline shortly after the intervention is completed and the endline at a later time point after the intervention is completed.

Our baseline data is collected before a WASH project handover, midline 3-6 months after project handover (depending on seasonality and project timelines) and endline one year after project handover.



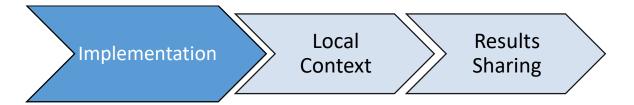


What is the most effective way to display and explain the BSC to study participants? There are many different options for using the BSC including drawings, pictures, models, and word descriptions. For the BSC to be effective, it needs to be understood by the study participants. Appendix 1 provides some examples of visuals used; researchers should conduct a thorough search to determine if any pre-existing BSC could work for their target group. Concurrently, conducting focus groups to learn the local words used for diarrhea symptoms and types is necessary to create a chart that is culturally appropriate and widely understood. Researchers in Ghana found seven different local terms for symptoms compatible with diarrhea. When researchers translated the BSC into Spanish they found certain words and descriptions of the seven stool types needed to be altered. For instance, for Type 6, rather than the English "a mushy stool", the Spanish translates, "como mermedlada o puré" - like marmalade or purée ⁵. Any chart (newly created or pre-existing) should be pre-tested with the target group and revised accordingly.

After choosing a BSC graphic that seemed the most realistic, OneVillage Partners staff practiced administering the survey to each other and worked out the best way to translate the survey questions into the local language of Mende.

Do you want to add any other questions to the survey? The research question will provide guidance about additional data to collect. The BSC provides data on the prevalence of diarrhea, but it does not provide any context to interpret that data. It may be useful to add in survey questions about diarrhea determinants including access or use of improved sanitation facilities, clean drinking water sources, or handwashing practices. You many also want to add in questions related to demographics if it is applicable to your project objectives (i.e. gender, age, income level). It may also be necessary to add in other measures of health status if diarrhea is not the only concern (for example, some researchers add an eighth stool type which depicts blood in the stool).

The first BSC surveys we conducted only asked about stool type using the BSC, along with the gender and age of the participant. In later surveys we added questions about use of sanitation facilities, access to clean drinking water and handwashing. This allowed us to better interpret our data.



What is the best way to implement the survey? The location of the survey and the target group will influence the field work. For example, when planning the time of year to conduct the survey, you should be aware of any activities that might take people away from their homes and plan accordingly. These activities could also fluctuate during the day; for example, if people go to their farms early in the morning,



consider doing data collection in the evening or make sure participants are properly notified in advance so you don't encounter empty houses during data collection in the morning.

After some trial and error, we now conduct the BSC between the hours of 7-9 am for two reasons:

- 1. Community members have asked that we do data collection early so they can spend the rest of the day working in their farms.
- 2. Most school-going children are at home during these hours and can be included in the survey.





OneVillage Partners staff collect BSC data

How will the local context affect the data? What steps will you take to address that? Starting in the design phase, it is advisable to investigate what local factors are diarrhea determinants (outside of the variable being tested, i.e. latrine construction). Is there a time of year diarrhea is more common? Why is that? Are there certain foods that contribute to diarrhea? Do you need to add in any survey questions to account for these potential confounders? It is important to consider local factors that may influence diarrhea prevalence when planning data collection time points and later when interpreting the results.

In Sierra Leone, diarrhea is affected by seasonal factors. Diarrhea prevalence increases in the rainy season because feces from open defecation is more easily washed into the water supply. The beginning of rainy season is also when mangoes are prevalent; mangoes are high in fiber and sorbitol (a laxative sugar alcohol) and if consumed in large quantities can cause diarrhea. 14

What is the best way to share results with the participants? Choose a results sharing method that considers the characteristics of the participants. If working with a group of people where the majority are illiterate, brainstorm creative ways to demonstrate changes in diarrhea prevalence over time. The use of infographics or role-playing can be accessible methods. Additionally, brainstorm the best forum to share results (i.e. community meeting, leaders only meeting, school assembly, health clinic staff meeting, etc.).

We share changes in diarrhea prevalence over time in a community meeting where everyone is invited. More information included in the **Results Sharing** section.



Training

Field staff should receive an in-depth training on the BSC prior to implementing the survey. Important topics OneVillage Partners includes are:

Purpose

- Why implement the BSC in this setting
- How the BSC evaluates project objectives

Implementation

- Sampling technique
- Eligible participants
- Informed consent and confidentiality
- Review of survey instrument
- Referral process for unhealthy participants
- Field work logistics

Data Analysis & Results Sharing

- Type of data the survey will produce
- Plan for results dissemination (program staff, program participants, funders, etc.)

Results Sharing

Once the analysis is complete the results should be shared with the survey participants. This is a good practice for many reasons. Foremost, it is the ethical responsibility of the researcher to share the results with the people who provided the data. Additionally, it is a great way to verify the data, revisit hygienic education messages, and create an action plan with the community to address areas that need improvement. Most times, we also find this exercise to be a great motivation for the community members to continue the hard work they have started, it provides numbers to support the anecdotal evidence of the project impact they have seen. Sharing results with community members is a key tenet of OneVillage Partners' MEL strategy. For us, one of the main reasons we do the BSC survey is to demonstrate to the community their success in meeting their self-defined goals. Over the years, we have piloted accessible ways to share the BSC results with community members (the majority of which are illiterate) including using a pair-wise matrix (pictured below) and simple demonstrations.





BSC results shared with communities using a pair-wise matrix and local materials

The results should also be shared with project design and implementation teams. The BSC is a great method to evaluate if a project met its goal of reducing diarrhea prevalence and improving health status. If the data does not show as much improvement as hoped for, the project team should research further,



potentially with more qualitative methods, to determine why the project goals were not met. This is also a good time to utilize any supplemental data generated from questions added to the survey. For example, if a community completed a latrine project, but does not have access to safe drinking water, it is not reasonable to expect a complete elimination of diarrhea. If questions were added to ask about drinking water source, that information could put the results into context and frame next steps for future projects.

Lessons Learned

Over the two years of implementation of the BSC at OneVillage Partners, we have continued to adapt the survey to best fit with the communities in which we work. The following are a summary of the lessons we have learned so far:

- Regular debriefs with staff highlight data collection issues and improve data quality. After every
 morning of data collection (BSC or other), we gather all staff involved for a short debrief in the
 afternoon to discuss successes, challenges, and ways the process can be improved. It is through these
 debriefs that the following lessons were learned.
- Tailor data collection methods to fit with your partner communities and organizational capacity. At first, OneVillage Partners collected BSC data by assigning specific items to certain age groups (i.e. a rock for a child under-five, a leaf for a child five and over, a stick for an adult) and then asked participants to place their item in the cup with the picture on it that matched their most recent stool type. Over time, field staff reported that the survey tool was bulky and the plastic cups drew unwanted attention by bystanders. Given this feedback, we transitioned the survey to an electronic format which was still interactive. We learned to always travel with an enlarged printout of the BSC for people with impaired vision who could not see the BSC pictures clearly on the tablets.



BSC placed on plastic cups for data collection

- Communication and transparency with key stakeholders are important. We have found that when key stakeholders know the purpose of the survey, the sampling method, and the planned timeline for sharing results, they are more willing to participate, encourage others to participate, and look forward to the results. "Key stakeholders" will vary based on the research question; for OneVillage Partners, one stakeholder we have learned to include from an early stage is the local healthcare worker. If the process and results are backed by the local healthcare worker, the community is more likely to accept them. The healthcare workers can also assist in conducting hygiene sensitizations during the results sharing community meetings. When healthcare workers were not involved, it caused problems during results sharing, in one extreme example, one contradicted the results and told the community not to believe them.
- Hours of day for data collection may need to be adjusted to ensure inclusion of certain participants.
 During the study planning, make sure you gain a full understanding of community activities and how those might affect your data collection. This will be especially important if you aim to include a very specific demographic group; arrange the data collection times to be convenient for them.
- Local contextual factors can highly influence data. Before conducting the BSC survey, do some formative research with participants around diarrhea prevalence. Ask them if there are any times of



year that they notice diarrhea is more common and if there are, ask them what they think influences those trends. This can help you in interpreting results and planning out data collection timelines.

Limitations

The BSC and its various methods of implementation can have some limitations:

- If the BSC is implemented as a stand-alone method, it is very difficult to understand what contributes to diarrhea prevalence. We suggest at a minimum adding in questions about use of improved sanitation facilities and access to clean drinking water to address this limitation.
- Not everyone is comfortable discussing the state of their last bowel movement. This survey may not work in cultures where discussing feces is taboo.
- The survey relies on self-report, there is no way to verify the data provided by the participant.
- The BSC is useful at identifying stool on either end of the spectrum, but it is more difficult to measure small changes to diarrhea prevalence (i.e. differences between type 6 and 7).
- The BSC is a good preliminary diagnostic tool, but it cannot substitute for actual stool tests to identify infections and medical conditions such as bacterial, viral, or parasitic organisms.
- The BSC depends on the ability to actually see one's stool post-defecation. It should be noted that certain types of waste management systems, including pit latrines, may not enable the use of the BSC.

Next Steps for OneVillage Partners and the Bristol Stool Chart

After two years of implementing the BSC, OneVillage Partners is excited to keep revising the process to make it more participatory and community-oriented. One area that we are currently working on is making the sharing of BSC results more participatory. We are researching the use of infographics to communicate changes in diarrhea prevalence. As we implement the BSC survey in new communities, we are confident our learning culture will help us identify additional ways we can improve the process.



Appendices

Appendix 1 - Bristol Stool Chart Versions

BSC Graphic #1

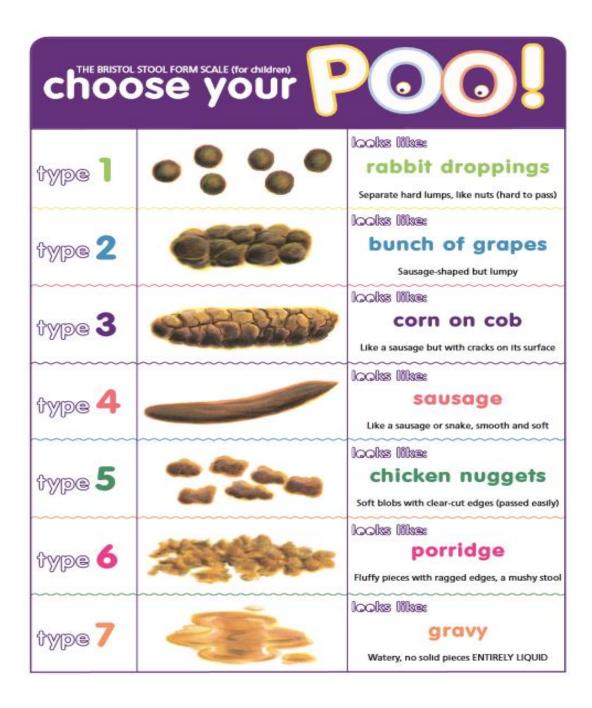
Source: http://www.tools4dev.org/resources/bristol-stool-scale-for-diarrhea-tool-review

Type 1	0000	Separate hard lumps, like nuts (hard to pass)
Type 2	6650	Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on the surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges
Type 6	2000年	Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. Entirely Liquid



BSC Graphic #2- Modified for Children

Source: http://www.bfwh.nhs.uk/childrens/docs/childrens%20bristol%20stool%20chart.pdf





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