Introduction
Autism Spectrum Disorder (ASD) emerges over the first two years of life, and the early signs of ASD are recognizable during this period. In Japan, over 90% of children receive health checkups at around 18 months (before 24 months) and around 36 months (before 48 months) in compliance with the Maternal and Child Health Act.

The 18-month checkup, in particular, is expected to play a role in the early identification of developmental disorders including ASD. Public health centers (PHCs) provide the checkups, and nurses are responsible for screening infants to identify developmental risks. The Japanese M-CHAT is employed at some PHCs; however, the majority still uses old-fashioned questionnaires and/or behavior observation lists, which is inadequate to screen ASD.

The goal in this study was to examine the feasibility and effectiveness of the Social Attention and Communication Surveillance (SACS) as a Level 1 screening tool within two PHCs in Gunma, Japan. The SACS was developed by Barbaro and Dissanayake (2010) at the Olga Tennison Autism Research Centre at La Trobe University, Australia. It is a community-based approach to identify children who are “at risk” for ASD before two years of age. The SACS behavioral checklists are used by trained nurses at routine baby checkups (at 8, 12, 18, and 24 months) in Victoria, Australia.

Methods

Figure 1 shows the flowchart of a typical checkup undertaken in Gunma. Because it is a mass checkup, the number of participants is about 20-30 each time, and the whole process takes about one and a half hours. As shown in Figure 2, children who are considered at risk for developmental disorders are then recommended intervention services, or referred to medical institutions. Typically a pediatrician or psychiatrist at such medical institutions makes a diagnosis of ASD.

The original SACS checklists were partially modified to satisfy the needs and requirements of Japanese checkups: First, the number of items was reduced to enable implementation within 10 minutes. Second, some items were adapted to Japanese culture. Finally, fine and gross motor items were added to screen children with other disabilities (See Table 1). This modified version of the SACS was named SACS-J.

In Gunma, the SACS-J was first implemented in Tamamura (270 births/year) and then in Shibukawa (500 births/year). As there are slight differences in age at which checkups are undertaken across the two settings (Tamamura: 15, 20, 27, and 38 months; Shibukawa: 10, 18, 24, 30 and 36 months) in Victoria, Australia.

Results

In Tamamura, a total of 166 children (i.e. those who attended both 15- and 16-month checkups) were monitored longitudinally between 2012 – 2017. Their diagnostic statuses were mostly confirmed by 72 months when they reached the school age.

The children were classified into 4 groups at 20 months based on the results of SACS-J at 15 and 20 months (Figure 3). Group A consists of 12 infants (7.2%) who failed in more than 2 SACS-J items at both checkups. Their low pass rate was consistent at 27 and 38 months. In this group, three were diagnosed with ASD by 72 months. The breakdown of the remaining nine is: two severe Developmental Delay, one ASD-suspected, and six who caught up by 38 months. Two additional children were diagnosed with ASD from other groups (Figure 4).

If this threshold (i.e. failing in any 2 items at the first two checkups) is applied, the sensitivity and specificity of SACS-J is 75% and 94.4% respectively, and the positive predictive value is 25% for ASD and 50% for any developmental concerns including DD.

In Shibukawa (Figure 5 & 6), a total of 183 infants (i.e. those who attended both 18- and 24- month checkups) were monitored between 2015 – 2017. Twenty-six infants (14.2%) failed in more than 2 items at both checkups, and 50.0% of them were also failed at 36-month checkup. In this group, two were already diagnosed with ASD and three are suspected as having ASD by clinical psychologists as of April 2018. The child from one group is also suspected as having ASD. We are still monitoring the cohort, and the data on the 36-month checkup is currently being collected.

Conclusion

The current data show that the successive failure (at two or three checkups) in SACS-J items is a serious indication of risk for ASD, suggesting that continuous developmental surveillance within the first two years of life can successfully identifying ASD in young children. The feasibility and effectiveness of implementing the SACS in a different cultural context was confirmed.

However, as shown in Figure 2, “detection” at checkups often does not directly link to “diagnosis” at medical institutions, and there is usually a time gap. Though there are multiple factors behind the gap, such as the lack of medical institutions and pediatricians capable of diagnosing ASD before two years of age, the major reason is considered to be parents’ reluctance to receive a detailed evaluation for their child. Most parents experience difficulty in accepting the fact that their child may have some developmental problems, and require time and support before convinced to see a doctor.

Therefore, “intervention” services provided by PHCs play a pivotal in providing support to the child and the parents in the absence of a diagnosis. We are now planning to introduce the ADEC (Autism Detection in Early Childhood; Young, 2007), a level 2 ASD screening tool, to this stage, so we could further examine the children identified at risk, provide them with more effective interventions, and help their parents cope with their child’s conditions.

Acknowledgements

We are grateful to Josephine Barbaro and Cheryl Dissanayake for their encouragement to implement the SACS-J.